Community Choice Aggregation 3.0: Reducing Greenhouse Gas Emissions

Prepared by Local Power LLC and Peregrine Energy Group

Supported by the Urban Sustainability Directors Network

Commissioned by the City of Northampton, in partnership with Northampton, Amherst, Pelham CCA 3.0 Task Force and an informal steering committee with core and observing members from Amherst (MA), Boston (MA), Cambridge (MA), Cincinnati (OH), Hanover (NH), Jersey City (NJ), Lebanon (NH), Northampton (MA), Pelham (MA), Pioneer Valley Planning Commission (MA), Saratoga Springs (NY), Somerville (MA), University of Massachusetts Clean Energy Extension, and USDN

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By Peregrine Energy Group

Introduction

This document contains two reports on the topic of Community Choice Aggregation (CCA). The reports have separate authors, different focuses, and offer different perspectives.

The first report, by Local Power, looks at CCA across the country and discusses new trends and opportunities. The report addresses CCA as an entity that is an umbrella for a range of programs.

The second report, by Peregrine Energy Group, focuses on Massachusetts and on how aggregation now works in that state, building on existing, proven approaches. This report addresses aggregation as a specific program, the aggregation of electric load, as distinct from the entity that sponsors the program.

The entity discussed in the Local Power report and the program discussed in the Peregrine report are both commonly referred to as "CCAs." To avoid the confusion, however, we have limited the term "CCA" to the entity as discussed by Local Power. The Peregrine report uses the term "Community Electricity Program" or "CEP" to refer to the program.

The two authors have very different perspectives and have not attempted to reconcile them in this document. Instead, the document presents two, standalone reports.

1. CCA 3.0 EQUITY LENS
By Local Power LLC

A. Introduction: Core 3.0 Equity Strategy

Many municipalities in the U.S. and around the world have declared climate emergencies in recent years, calling for accelerated, rapid, scaled greenhouse gas reductions that can only be achieved through a profound transformation of energy as described by the United Nations in March, 2019.[1]

A profound transformation of energy requires a shift from policies designed for incremental progress to policies designed for rapid physical change. This means not merely a *mitigation* of fossil fuel use, but a physical replacement and elimination of fossil resources.

This shift is not occurring under prevailing regulatory regimes for renewable energy, namely: (1) Renewable Energy Credits (RECs), which create market incentives to renewables developers, but continue in the consumption of conventional fossil-centered supply; (2) development of centralized renewables, which while superior to RECs in causing physical and regional carbon reductions are inherently limited in reducing carbon emissions due to the energy grid's need to balance intermittent resources with fossil fuel-based balancing capacity; and, (3) Net Metering (NEM) and Feed-in-Tariff (FIT) programs that offer greater carbon benefits to centralized renewables, but are inherently limited, perpetuating the solar owner's reliance upon imported fossil power from the grid, functionally separating renewables from the buildings on which they are sited, and making the customer financially dependent on exporting onsite renewable power into a highly voltage-constrained, low voltage distribution grid.

Recognizing that these widely used incentive mechanisms for renewables, having perhaps been useful for their early market development, are utterly inadequate for the scale and schedule of energy transformation required for climate mobilization, eleven U.S. cities have requested nationwide guidance on how to directly build at scale, rather than merely "incentivize," local renewables and energy efficiency, and how to disengage from, not merely mitigate, fossil fuel power plants. These eleven cities from five states[2] with Community Choice Aggregation (CCA) laws in place, are interested in using their community-wide energy purchasing programs not merely to purchase Renewable Energy Credits, but to plan and facilitate voluntary customer investment in local renewables and energy efficiency technologies. Accordingly, this document approaches climate mobilization through an "equity lens" in which private sector engagement in local green energy investment presents a clear path to scaled, accelerated regional decarbonization. Specifically this document identifies distributional opportunities, access opportunities, social equity opportunities and energy democracy opportunities that may be realized by a new iteration of Community Choice Aggregation

[1] https://www.un.org/press/en/2019/ga12131.doc.htm

[2] **Massachusetts** - Northampton, Amherst, Pelham, Pioneer Valley Planning Commission, Boston, Cambridge, Somerville; **New York** - Saratoga Springs; **New Jersey** – Jersey City; **Ohio** – Cincinnati; **New Hampshire** – Hanover.

known as CCA 3.0, articulated in the section of the report entitled, "CCA 3.0: Local Pathways to Climate Equity," also referred to as "CCA 3.0 Pathways."

These municipalities, many of them with CCA programs already underway, commissioned this document to outline a new CCA model that will engage the whole community: to create benefits of environmental justice, and to ensure an equitable distribution of program benefits, including "equity in ownership of renewable energy." Articulating the rate and charge structures that will be employed to make this happen, a new CCA business model and governance model, they stated, should be designed to deliver "inclusive representation" in the form of both *citizen engagement* in CCA decision-making and *customer engagement* in the renewables and energy efficiency technologies that are built.

In fulfillment of these goals, the "CCA 3.0 Pathways" report presents three major new elements – (1) *municipal* partnership, (2) customer *shares*, and (3) customer *cooperatives* as defining a "climate equity" platform, incorporating several forms of energy equity, defined by the project as:

- **Procedural equity or inclusion**, meaning "inclusive, accessible authentic engagement and representation in the process to develop or implement programs or policies";
- **Distributional equity or access**, in which "programs and policies result in fair distributions of benefits and burdens across all segments of a community, prioritizing those with highest need";
- **Structural equity**, under which "decision-makers institutionalize accountability, (where) decisions are made with a recognition of the historical, cultural, and institutional dynamics and structures that have routinely disadvantageed privileged groups in society, and resulted in chronic, cumulative for subordinated groups", and;
- **Transgenerational equity**, for which: "decisions consider generational impacts and do not result in unfair burdens on future generations." [3]

Incorporating energy equity within a climate mobilization strategy, this report is intended to explain and contextualize the equity-centered program design articulated in the "CCA 3.0 Pathways" report. Moreover, this "Equity Lens" report makes the case that energy equity is itself a necessary strategy for achieving the "transformational" magnitude of physical greenhouse gas reductions called for by the United Nations.

The CCA 3.0 program design incorporates each of these forms of equity into an operational CCA agency business model based on building internal capacity to create local energy equity, participatory governance and accountability to ensure their realization, and program structure to effectively engage democratic and economic participation by all members of the local community:

- *Procedural equity* highlights the dual nature of engagement of community members as citizens and consumers, including (1) a participatory democratic

[3] Angela Park, "Equity in Sustainability: An Equity Scan of Local Government Sustainability Programs," Urban Sustainability Directors Network, September, 2014.

process of defining policies and programs, and also (2) equitable customer participation in economic benefits.

- *Distributional equity* requires an active engagement of low-income, fixed income, and small- to medium-sized businesses eligible for equity irrespective of their credit score, to participate in program or policy benefits, such as ownership.
- *Structural equity* requires both a governance model that encourages accountability by elected officials and staff, and an active solicitation of under-represented, particularly low-income residents to participate in both CCA decision-making and investment.
- *Transgenerational equity* recommends an energy strategy that reduces carbon emissions today, rather than waiting until a future date, to avert compounding future costs. Inherent in CCA 3.0 program design and policy is that it is implementable now, and should not delay important decisions that compound the cumulative burden of climate change cost on future generations. Specifically, CCAs 3.0 should commit investments in transforming energy to scale up impact on climate disruption and equity, not merely mitigate a static utility business model.

The CCA 3.0 program design is built upon the fact that equitable energy ownership, as opposed to equitable consumption of energy, is a precondition for the transformation of the vast majority of energy use, from automobile purchase choices for transportation fuels, to electricity generation technology choices for power fuels, to building heating, ventilation and cooling (HVAC) and hot water heater choices for heating fuels. The difference between CCA 1.0 and 2.0, further articulated in the “CCA 3.0 Pathways” report, is like the difference between an energy efficient gasoline car and a renewably-powered electric vehicle. The difference between 2.0 and 3.0 is more akin to that of giving the hungry person a fish versus a fishing pole.

CCA 3.0 resolves to conclusively replace conventional fossil fuel-based grid power resources through inter-municipal planning, finance and development, rather than merely “mitigating” continuing fossil fuel demand by making ongoing market incentive payments. Specifically, Distributed Energy Resources (DERs), encompassing all behind-meter, load reducing renewable energy, energy storage, energy management, fuel switching, conservation, and energy efficiency measures, define the technological suite of this strategy.

The potential for the 1500 existing U.S. CCA 1.0 programs to CCA 3.0, which is the premise of this document, represents a new strategy in both articulating a renewable energy pathway to climate mobilization (through DER) and distributional and procedural equity (through customer ownership).

The habitat of energy transformation is in homes and businesses. Unlike the New Deal’s public sector orientation, a “Green New Deal” must transform the *private sector*, which consumes the vast majority of energy. Equity defines a revenue strategy based on demand-side load reduction as opposed to supply-side energy trading. Combining energy equity and climate action into one strategy, “climate equity” is not merely a concession that municipalities *should* offer economic benefits to low- to middle-income residents and small businesses in the process of climate mobilization, but recognition

that their participation is a *structural precondition* for successful climate impactfulness of those very mobilizations. In this way, voluntary investment throughout the private sector is not an option, but a *requirement* for rapid decarbonization.

Finally, CCA 3.0 facilitates voluntary customer investment in small, modular DERs on homes and businesses that reduce demand for grid and pipeline resources, rather than centralized renewable generation that adds to such demand. The technology suite of CCA 3.0 reflects plummeting cost of onsite solar and other renewable energy (RE) plus storage, including batteries, renewable HVAC/hot water and electric vehicles, to exponentially grow the horizon of transformation achievable under existing regulatory and system constraints. Whereas Net Energy Metering (NEM) and Feed in Tariff (FIT) systems are constrained by utilities and regulators, and cause voltage regulation grid impacts that severely limit the potential of DER penetration in distribution grids, the 3.0 approach articulated in this report uses integration and fuel switching to avoid the financial necessity of exporting power from DER sites altogether. In so doing, CCA 3.0 enlarges the level of potential penetration from less than 10% today to more than half, and potentially as much as 75% of the annual load in any given area of the distribution grid.[4]

This approach dramatically ramps up the level, schedule and firmness of greenhouse gas reductions that are economically achievable in CCA 3.0, above and beyond levels achievable by conventional state- and investor-owned utility programs. Presenting a new horizon of economically implementable sustainable energy development, it is made possible by focusing on:

- Partnerships with CCA member municipalities to provide financial and account support for their residents and businesses, and developing shared renewables facilities on municipal properties;
- Engagement with, development and operation of, onsite microgrid-enabled renewables and renewables plus storage on homes, businesses and local public agency properties based on site energy requirements;
- Providing retail products based on customer shares and customer cooperatives to engage the majority of customers who do not own economical DER host sites.

This programmatic leap, comparable to this last decade's leap from purchasing energy supply products under CCA 1.0, to developing centralized renewable generation under 2.0, may be described as a shift to facilitating customer investment and ownership benefits of avoided grid power and fuel consumption. Whereas export-based customer ownership models, Net Energy Metering and Feed in Tariff programs have effectively excluded the vast majority of residents and businesses who are not owners of new, unencumbered south-facing rooftops, CCA 3.0 exponentially increases the potential participation of low-, medium, fixed income residents and small- to medium-sized businesses in such investment and ownership benefits.

[4] For example, see Local Power Inc., "CleanPowerSF In-City Buildout Program Design and Business Case" (2013) http://localpower.com/CleanPowerSF.html

Ownership creates a new paradigm of value for customers that is broader than, but also encompasses, the cost per kilowatt-hour or "rate." Energy efficiency, long-competitive with the cheapest fossil power (whereas RECs add to the cost of such power), as well as onsite "solar-plus-storage," is cost effective against the cost of renewable system power in dense energy use environments. HVAC/hot water fuel switching creates savings from avoiding more expensive natural gas and fuel oil, and electric vehicles create savings from avoiding more expensive gasoline. Thus, the CCA 3.0 approach will provide lower ongoing costs for customers while creating greater equity benefits, particularly ownership (future bill offset) benefits, for any customer that voluntarily signs up for them. Finally, such investment confers secondary economic benefits on all members of the community: DERs targeted geographically and temporally to reform a CCA's aggregate load duration curve creates secondary savings for all CCA customers, not just those who make voluntary investments, in the form of lower CCA capacity requirements, charges and "tags" on monthly bills.

In addition to the development of DERs on municipal properties as shared renewables sites, municipalities will play an important role in their financing relationship to customers and building owners under CCA 3.0, as well as in data sharing, planning/permitting DERs, and the use of public rights of way for DER components like EV chargers and microgrids. Employing existing municipal service resources, municipal activity costs will be funded from an account management fee on customer DER loan agreements, and costs avoided by municipal DER and revenue generated by sales from municipally-owned renewable generation facilities.

As the operational business model changed from 1.0 to 2.0, it does again under a CCA 3.0 program, which must build capacity to undertake a new set of activities centered around local redevelopment, municipal cooperation, and customer engagement. CCA agency staff will provide energy planning and procurement functions, serving as an "umbrella" energy procurement and services administrator, in a mission-focused micro-agency. This micro-agency will directly negotiate with suppliers or generators, to plan, develop and administer the local DERs, with CCA member municipalities invited to participate as their partners, and with customers as their intended beneficiaries. CCA agency costs will be recovered from adders and rates in program revenues, state funding, and grants. As CCA partners focused on customer finance, member municipalities will recover costs from increments on customer financing repayments.

The defining elements of a climate-impactful CCA 3.0 equity strategy are:

- Encompass not only conventional plug loads but also HVAC/hot water and electric vehicles (EVs);
- Engage member municipalities in development and customer finance;
- Engage customer investment through shares and cooperatives;
- Shift renewables paradigm from RECs, NEMs and FIT transactions to non-exporting DERs;
- Build CCA staff capacity around DER planning, products and development, customer services and enrollment, and member municipality coordination;
- Shift to Direct Retail or Direct Wholesale business model and confine outsourcing to local DER installation and new program/product development;

- Establish a Job Order system and coordinate with local job training programs (e.g. unions, universities) to support local contractor participation and local job placement.

B. Technologies of Social Equity

Equity-conferring technologies are located in the buildings that use their physical energy and in the blocks or neighborhoods of the consumers who invest in them. CCA 3.0 customers will receive bill credits reflecting cumulative ownership in the technologies based on monthly utility bill payments. These technologies include HVAC and hot water appliances and electric vehicles, which serve as recipients of real-time excess capacity, or "storage." Storage and onsite renewable generation are integrated through microgrids and control systems, and offered as integrated assets for customer share ownership by participating CCA customers.

A robust program will offer several forms of equity options to guarantee inclusiveness, expand access, and maximize climate impact. Some products will be physically shared, others virtually through shares and cooperative agreements, while others are owned individually as consumer appliances, control panels, storage management systems, like Internet Protocol (IP) thermostats and EV chargers, or other energy retrofits in homes and businesses.

The primary technologies to serve a CCA 3.0 are:

1. In-building, on-block, in neighborhood renewable generators within CCA jurisdictional boundaries;

2. Demand management technologies in homes and businesses (and public agencies):

    a. Electrical energy efficiency,

    b. IP thermostats and Heating, Ventilation and Air Conditioning (HVAC) efficiency, hot water efficiency and conservation,

    c. Hot water appliances (shared or individual);

3. Solar-integrated electric vehicle sharing, collectives and ownership;

4. Renewable onsite HVAC and hot water (fuel switching);

5. Resilience-enabled microgrids (shared, municipal or nonprofit);

6. Software as a Service web portal and/or transactive energy platform (CCA-licensed or contracted- see Glossary);

7. Storage-dispatchable load control systems (commercially available under interoperable equipment standards).

C. Energy Efficiency Financing for Energy Equity

Apart from the opportunity for CCAs in Massachusetts and California to administer energy efficiency funds locally, energy efficiency *finance* is a critical component of any DER development pathway, because Demand Side Management (DSM) measures are the most cost effective resources with the shortest customer return on investment.

Through a 'shared savings' arrangement, a portion of the associated bill savings should be diverted to cover municipal customer loan repayments while also paying the cost of CCA program administration/development/operation, municipal finance contract administration and planning costs. This is similar to the business model of a demand-side management contractor or Energy Services Company (ESCO). Depending on the customer type, efficiency savings typically provide ample room for a 'win-win-win' in which the customer, the program, and all ratepayers benefit economically from energy efficiency measures. [5]

The financing approach to energy efficiency overcomes numerous barriers that exist under the current paradigm of providing rebates and asking customers to pay for upfront capital costs. Among them are:

1. Bill Neutrality

The loan repayment may be structured to match or be lower than the monthly utility bill savings, resulting in a positive cash-flow for the customer immediately.

2. Landlord-Tenant Split Incentives

These occur when property owners must pay the costs for capital improvements, and tenants pay for the energy bills. Many commercial leases stipulate this arrangement, and rent control regulations limit the costs that a property owner may pass through to residential tenants. This precludes deep investment into energy efficiency, as the landlord must pay the cost but the tenant receives the financial benefit.

3. Initial Cost

The capital cost of efficiency is a barrier to program participation for many customers.

4. Longer Paybacks

Financing can match the payback or even lifetime of the measures installed, leading to deeper retrofits.

[5] Laws regarding use of municipal water/sewer/garbage/tax billing for energy efficiency finance depend on statutes, and municipal ordinances and charters.

5. Avoidance of Debt

As an off-balance sheet mechanism, program financing will obviate the need to pay for efficiency measures out of capital budgets (which are typically harder to access). This is relevant to commercial and institutional customers.

6. Opportunity Cost of Capital

In many projections for energy efficiency in terms of Return on Investment (ROI), a proposed retrofit may make financial sense, but the customer may well make investment decisions based on broader criteria. For example, a business may wish to spend its limited capital on its core competitive activities rather than building and appliance upgrades.

7. Transactional Costs

While energy efficiency financing mechanisms do exist for certain customer types, navigating available options and negotiating with lenders directly adds a transactional cost to each project, and is also a hassle for the customer. Both of these drive down participation, and are avoided by having the program itself structure and execute financing agreements.

8. 'Shared Savings' Agreements

CCA 3.0 financing of energy efficiency measures in homes and businesses would include a 'shared savings' agreement: in return for financing and implementing the measures, the CCA, municipality, or JPE would receive a portion of the value of the efficiency savings that result.

9. Repayment Mechanisms for Demand Side Management

On-bill financing (OBF) is the preferred repayment mechanism to service the debt on deployed demand-side assets, because it offers the ability to tie repayment to the meter rather than the CCA customer; this allows deeper retrofits with longer repayment timelines. While many distribution utility billing systems are technically capable of processing on-bill financing charges, they are typically unavailable, such that it is necessary to explore alternative repayment mechanisms in addition to on-bill financing. These alternatives include on-bill financing on municipal water/sewer/tax bills through engagement of building owners, or else contracting with software-as-a-service companies on cloud-based platforms to provide DER back office services, including reporting, customer care, online billing and payment, and utility electronic data interface (EDI) communication.

Under the municipal billing approach, municipalities will arrange with landlords to transfer the repayment obligation from the electrical meter to the water meter through creation of a unit specific account. For the residential sector, this mechanism would be

easily deployed for owner-occupied single-family homes, which have a single occupant, water meter, and power meter.[6]

Under the contractor-billing model, CCA customers will receive CCA-service-based loan account services through the CCA's customer portal, in which they may access their individual energy consumption, billing information, savings, environmental impact, and other account information as determined by the CCA.

While municipal billing offers a stronger platform of engagement, either of these approaches will significantly increase DER program participation as well as the average savings per retrofit. This is because the scale of the retrofit will be based on what makes the most long-term financial sense, instead of on what the customer can afford to implement at a given point in time.[7] It should also lower the transactional costs of collecting payments for efficiency measures installed.

10. The Value of a Negawatt

Another barrier to customer adoption of energy efficiency is uncertainty surrounding the financial benefits of the efficiency measures installed. Selling efficiency is in large part convincing the customer of benefits that cannot be measured directly, as it results in the avoidance of consumption. In addition, many customers may temporarily see bill savings after a building retrofit, but then will install a large appliance (e.g., a hot tub) and see their bills increase. This is sometimes referred to in the shared savings sector as the 'hot tub' effect. If the customer is unaware of this effect, it could negatively impact their perception of the program. This is less of a problem for larger and more sophisticated customers, as they typically employ maintenance personnel that understand these issues, and the project is large enough to negotiate a highly tailored shared savings agreement.

For smaller projects, point-of-sale software allows for transparent demonstration of projected bill savings. Program delivery mechanisms should ensure that the 'hot tub' effect is explained to the customer, and implement a shared savings agreement that takes this into consideration. Similar functionality should be incorporated into customer web-portals, such that the customer may see how much their efficiency measures have saved them in energy costs, and what their bill would have been absent the measures. For more complex projects at larger sites, the use of 'Smart Building' end-use metering equipment and associated pattern-recognition software should be deployed (where cost-effective), both to monitor and prove savings, and to guard against savings degradation over time (continuous retro-commissioning).

[6] This method is being proposed here for the first time as a solution to the problems CCAs have historically encountered relying on investor-owned utility bills to support on-bill financing products. Thus, the program design element articulated here for the first time has no known examples among previous CCAs.

[7] CCA/municipal on-bill financing is proposed here as a billing method that does not require additional legislation, unlike utility-based on-bill financing. In general, on-bill financing is widely recognized as a best practice for extending credit for energy efficiency measures to otherwise unqualified low-income customers, for achieving lower loan default rates, etc.. For analysis of the benefits of legislatively mandated investor-owned *utility-based* on-bill financing programs, see Miguel Yanez' "On-Bill Financing: an Innovative Approach for Energy Efficiency Finance," Environmental and Energy Studies Institute, 2017. https://www.eesi.org/files/Miguel-OBF-presentation-NASEO-2017-Western-Regional-Meeting.pdf

D. How to Access Social Equity

For purposes of CCA 3.0, distributional equity is defined as a reasonably expectable multi-decade economic benefit, much in the manner of a low-to medium-risk/yield investment or retirement account. In this case the benefit is manifest in accumulation of shares in DER and the value of energy generated for the life of DER equipment. Savings are generated by long-term forecasted cumulative energy demand offsets and not short-term transactions. This can take various forms based on state CCA laws and regulations, and municipal governance statutes that define the economic development and community services practices of cities and towns. These also vary by municipal policy and charter, which provide for planning and executing new programs for public welfare and safety.

The CCA 3.0 program is designed to avoid barriers to CCAs to directly manage equity by partnering with member municipalities to manage the investment relationship with the customer, and administering the procurement planning and administration (billing and data processes) on behalf of the customer. This is done by a cooperative arrangement, between a CCA agency and a member municipality that offers a DER loan to a resident or business owner who is a CCA customer and has opted "up" (shares) or "with" (cooperatives). Under this arrangement, the CCA customer voluntarily chooses to pay a CCA to "invest" in a product involving a rate premium (per kilowatt hour or voluntary surcharge) that the CCA has agreed to transfer to the municipality's customer DER loan account. As the loan is being repaid, and financial equity accumulates, the CCA applies credits to the customer's bill reflecting that ownership, much as would occur in the purchase of solar panels for one's home or business. Thus, the customer, rather than a REC seller (in the example of a 100% renewable REC product), will receive the cumulative financial benefit of his/her history of monthly premium payments going forward.

Voluntary organizations will be formed by CCA customers outside the powers of municipalities that will be facilitated by a CCA-adopted policy and administrative protocol. Cooperatives or local business and institutional groups may include neighbor-initiated microgrids, commercial complexes, multi-residential buildings, mixed use areas and live/work buildings, 24-hour access buildings, institutional campuses, essential public facilities, with the municipalities themselves acting as owners of buildings and fleets, and consumers of energy and transportation fuels. All of these are particular development targets of this approach.[8]

As municipally formed and governed programs, CCAs already benefit from referred to in Peregrine's chapter on Massachusetts CCAs[9] as the high level of public trust in municipal government, compared to a very low level of trust toward energy marketers, including green energy marketers. Local Power's "CCA 3.0 Pathways" report describes public mistrust of competitive suppliers resulting from chronically misleading offers and fraud as a massive barrier to public participation in all green offerings, including DERs.

[8] Cooperative membership structures and rules vary by co-op, but must include provisions for residents that elect to relocate or otherwise terminate membership, as well as provisions for offering admittance and receiving new members in their place.
[9] See Peregrine Energy Group's chapter below in this document.

Climate mobilization depends upon residents and businesses choosing to invest in local DER. By partnering with municipal governments to assume a key customer-facing role in equity, CCA 3.0 will strengthen this trust with customers to drive up participation rates above conventional levels of green pricing and community solar, which, being limited to owners and customers able to pay premiums with no payback or return-on-investment, are inconsiderable. CCA 3.0 programs will focus strategically on establishing trust through local citizen engagement, adopted policy declarations of public purpose, and operational transparency and full financial disclosure with customers: elements which are sorely lacking in conventional energy markets whether regulated or unregulated.

Most current CCA practices outside California in which CCAs do not administer the customer relationship, leaving customer call centers and account management to their chosen retail suppliers and CCA brokers, miss a massive opportunity to get the attention of community members and civic and community organizations with the message that this program is *different*. Such CCA programs are over-dependent upon the crucial opt-out enrollment mechanism that CCA creates, neglecting to add more voluntary choices for customers who consent to participation in CCA services. A climate mobilization can be no less than something significantly different from the status quo: a new deal. In this respect, a CCA 3.0 is a Green New Deal in actual fact, not a *de minimis* government program with marginal benefits. CCA 3.0 represents a coordinated action of the community (residents, businesses and municipal government) to co-invest in a physical local climate mobilization.

Local Power's “CCA 3.0 Pathways” chapter below outlines a customer engagement strategy for the CCA to actively solicit and manage development of DER facilities at economically advantageous and energy-critical sites that are identified from CCA-held billing data histories, and a Job Order system to solicit developers for CCA-compliant bids to develop and maintain DERs. The CCA can partner with local educational institutions and unions to train workers for placement in planned local DER development, and use the job order system for local contractors to facilitate job placement applications.

Along with CCA 3.0’s programmatic expansion to EVs and heating/hot water, and the engagement of customer investment, local labor and economic development elements form a comprehensive climate equity impact worthy of the name “Local Green New Deal.” CCA 3.0 can provide equity customer benefit to a broad swath of the local and regional population in diverse ways, including:

1. Energy efficiency (avoided consumption),

2. Shares (bill offsets),

3. Co-op membership shares (bill offsets and avoided consumption),

4. Electric vehicle collectives, sharing and individual ownership (bill offsets and avoided gasoline costs),

5. No-commute energy efficiency and development jobs (resulting from locally-based labor and contractors whose *avoided transportation* reduces greenhouse gas emissions and whose local economic activity results in economic multiplier benefits and wealth retention in the local economy),

6. Short-commute contracts for developers (reduced transportation greenhouse gases and regional economic multiplier effects),[10]

7. Neighborhood energy independence and resilience (available onsite stored energy during utility transmission/distribution grid failures).

E. Financial Stability and Sources of Revenue for CCA 3.0 Energy Equity

The keys to financial stability are (1) diverse sources of funding and (2) a light cost/revenue ratio, as explored in the following.

1. Diverse funding sources from startup to operations

The first key to municipal financial stability is that its role in the program is, while important, *de minimis* compared to the CCA program's "enterprise-" level roles and responsibilities, being limited to (1) Green Bonds and customer financing account management, (2) CCA billing/communication services (3) use of DERs in municipal facilities and fleets. Under the CCA 3.0 model, The CCA provides all other work and assists the municipalities in adapting their existing billing and communications platforms to support the CCA-initiated projects, coordinating with their planning, permitting and billing processes, and educating staff and decision-makers. Municipal program costs are recoverable through an increment on financing payments, revenues from municipal shared renewables facilities, and sales of energy from municipally owned renewable DERs as well as lease fees on rights of ways, and state government grants.

A universal shares[11] offering, like the traditional industry term of use "universal service" means that all customers participating in a CCA program will be *offered* a shares package of one kind or another. Under the enrollment procedure, the customer will receive, alongside the option to "opt-out" of the CCA, should they not choose to opt-out, an additional voluntary choice to exercise an optional service within a service, paid through an adder or rate (depending on the state), to voluntarily pay a premium on his/her bill to accumulate ownership of local DER. Consumers checking this "opt-up" box would be enrolled pending confirmation by his/her municipality that a

[10] State and local laws define the rules governing municipal procurement. While this report does not include a legal analysis of the rules in each state or municipality, and mandatory local sourcing practices are generally not allowed, point award systems and local training and hiring processes are generally accepted methods of giving preference to local contractors in municipal solicitations/procurements. Accordingly, CCAs in each state should determine the best approach to take to establish local preferences accordingly. No-commute and short-commute provisions are mentioned here because they confer broad public benefits, not merely benefits to the local community, based on reduced transportation-related greenhouse gas emissions.

[11] The "universal shares offering" component of CCA 3.0 is also discussed in the CCA 3.0 Pathways section.

corresponding DER loan has been executed. Charges and credits would commence upon CCA-administered commissioning and launch of specified DER installations.

Shares extend DER ownership to the majority of customers like renters who don't own or occupy cost effective or feasible sites for DERs, and are typically excluded from eligibility by utility and third-party DER products and programs.

Shares could be called a more "passive" distributional equity offerings, for which any resident/business will be eligible irrespective of their occupancy status or geographic location within the participating member municipality. Alternately, active consumers organizing a renter's microgrid cooperative with building owners, or multiple owner occupied buildings, may proactively apply to the CCA and municipality for financing and developing/administering accounts for their own onsite, on-block or in-neighborhood microgrid.

Whether a municipality employs its own revenue bond authority, partners with a local bank or credit union, engages available state financing (e.g. Massachusetts' zero interest loan program referenced above) or engages third party financing (with declining local equity benefits in that order), the structure (if not the quality) of equity is the same, simulating the benefits currently received by wealthier consumers who own properties and install DER on them. However, whereas the revenue basis of equity under conventional DER comes from Net Metering and FIT payments, CCA 3.0 equity revenue originates in avoided grid energy supply and transmission/distribution charges, and customer sharing of flexible resources.

Under this approach, the CCA, which evaluates candidate sites for development based upon CCA cost of service analysis of customer meter data, tailors a DER technology package provided with a forecasted customer Return on Investment (ROI) for the package. The municipality then approves or denies the resident, business or cooperative for financing, and if approved, estimates ROI for the customer, based on currently available capital cost. Final approval may depend on an underwriter. The steps are:

a. Customer makes a decision based on CCA-forecasted ROI, which includes increment to fund municipal and CCA administrative services.

b. The accumulation of customer shares determines monthly energy bill offset.

c. Energy efficiency is financed by sharing savings between customer and all other customers in a CCA (in addition to separate energy efficiency funds administration in MA/CA).

d. Customer equity accumulates over seven-20 years based on public solicitation responses, generating reported monthly DER net kWh.

e. Energy equity continues to generate energy and revenue after ROI, as well as ownership of solar DER equipment as long as it continues to generate revenue. The program will compensate the customer while

continuing to cover CCA maintenance, operation and administration. With the loan retired, the municipality would cease to collect an increment.

f. The transaction will result from a DER Software-as-a-Service and/or Transactive Energy Platform monthly ledger to CCA, which allocates loan payments based on customer-generated/stored energy[12]

2. Funding focused on revenue generating activities/local development

The second key to CCA financial stability is defining its mission and focus not as an energy seller or "utility lite" but an administrator and developer of local customer-owned DER.

CCAs have very light administrative staffing requirements after startup compared to the revenue being managed and investments developed and operated. Because power supply and distribution are already managed by the utility, CCA power procurement is conducted by one person, and the other staff are support personnel focused on DER development and operation: data, DER metering and account management, call center, planning, regulatory compliance and contractor management. All DER projects are implemented by contractors under performance contracts in which costs are internalized in customer rates, such that the operational cost to program funding ratio is very small, the program light: a micro-agency partnered with member municipalities to coordinate significant levels of local economic development in the private sector.

Having a relatively light staff with most staff focused on development creates positive cash flow. CCA programs in some states establish operational reserves in order to be able to directly issue revenue bonds. Some states limit the ability of CCAs to establish reserves, but municipalities introduce important investment and planning resources to support a partnership approach, through an inter-municipal agreement or creation of a Joint Powers Entity. Stable sources of revenue available for a CCA and (DER loan-administering) member municipalities to fund a sustainable, growing program come from the following sources, in order of access and of potential magnitude:

a. Administrative adders/fee (taking the broker's responsibilities in-house);

b. Operational adder/fee;

c. Energy efficiency program funds;[13]

[12] Crowdfunded projects must comply with Securities and Commission rules for "exempt offerings," which (1) require all transactions under Regulation Crowdfunding to take place online through an SEC-registered intermediary, either a broker-dealer or a funding portal; (2) permit a company to raise a maximum aggregate amount of $1,070,000 through crowdfunding offerings in a 12-month period; (3) limit the amount individual investors can invest across all crowdfunding offerings in a 12-month period and; require disclosure of information in filings with the Commission and to investors and the intermediary facilitating the offering. Securities purchased in a crowdfunding transaction generally cannot be resold for one year. Regulation Crowdfunding offerings are subject to "bad actor" disqualification provisions. States "blue sky" laws also apply.

[13] In its first draft report, Peregrine estimates a Northampton/Amherst/Pelham CCA could administer $5M per year in energy efficiency funds. At 2.2 million MWHs of load and 205,000 customers, the Cape Light Compact administers approximately $42M/year.

d. (for municipality) Finance contract administration charge - a percentage of debt service.

3. Delegation of customer DER finance administrator in member municipalities electing to partner to facilitate CCA Energy Equity through Rate Structure to residents and businesses within their jurisdictional boundaries

CCA member municipalities are a critical resource for CCA 3.0 because municipalities are widely known and trusted, possess significant resources of high value to CCA DER equity marketing, and can leverage financing or organize trustworthy financing options for local residents and businesses. Municipalities also provide: the operation of multiple scheduled billing and public information direct mail to residents and businesses, leverage in utility interconnect permit and potential government permit and funding applications (depending on what is being developed), and standing as state chartered corporations in state government agencies, concerned either with CCA or renewable energy development or consumer protection.

Under CCA 3.0, member municipalities will provide financial administration and potentially municipal revenue bond ("green bond") financing to individual residential and commercial customers of the CCA whose business or residence is located in its territorial boundaries.[14] The role of municipalities as CCA customer shares partners consists of six activities:

a. Municipal bill account charge and security;

b. Float revenue bonds (taxable for public benefit, tax-free for private) or contract available state-based financing or other local lenders (local cooperative banks, credit unions, local banks) for project underwriting of the off-bill financing arrangement (or on-bill if regulations are adopted);

c. Sign and submit utility distribution company interconnect permit application for CCA-developed DER facilities;

d. Grant CCA option on municipal properties and rights-of-way for DER development for shared microgrids in which each customer pays a voluntary rate to receive bill credits based on the CCA-administered accumulation of share equity;

e. Create data link to the CCA's monthly premium transfer system;

f. CCA-Member Municipality Relationship.

[14] As indicated above, in states that allow CCA agencies to set aside funding for investment and credit rating purposes, Joint Powers Entities that establish credit ratings may also take the role given here to member municipalities, however experience has shown it can take quite a few years for newly established JPEs to get rated for the purpose, such that this approach must be regarded as secondary to the municipal role. As indicated elsewhere, the importance of name recognition and trust for effective engagement of consumers also underscores local municipalities, not new regional bureaucracies, as the appropriate administrators of customer DER loans.

4. CCA-Member Municipal Interaction under CCA 3.0

The interaction between municipal agencies and CCA staff is fairly light, focusing on providing very circumscribed forms of support in a routine schedule. The CCA provides the lion's share of ongoing work to request specific actions from staff, while municipal governing boards make policy decisions at routine meetings. Staff coordination and cooperation is most time-consuming during formation, subsiding to an account management system, project finance approval protocol, and permitting consultation. Their interaction will occur through the following channels:

a. MOU defining CCA services, municipal services and administrative funding;

b. Data sharing and shared municipal facilities frame agreement;

c. Planning and acceptance;

d. CCA premium to municipal loan repayment contract.

F. Environmental Justice and the Distribution of Benefits through Equity in Ownership of Renewable Energy

In order to extend equity offerings across the local population, diverse forms and technologies of equity is offered based on a shares and cooperative engagement model.[15] Under the proposed universal shares and cooperatives processes, a CCA will sign a Memorandum of Understanding (MOU) with member municipalities adopting a protocol to collect and pay CCA “opt-up” shares and “opt-with” stakes premiums to repay municipal DER loans and credit bills based upon accumulated shares and/or stakes:

1. DER finance security for renters, customer churn, customers missing payments

CCA 3.0 leverages a customer’s bill payment capability to repay financing, as opposed to traditional rebate and subsidy programs, which tend to help reduce costs for (the minority) of customers who can already afford to provide more of the up-front capital costs on their own.

While the overall pattern of power customers is typically stable in terms of bill payment, there are some potential payment issue scenarios that will need to be addressed in program design and management. A CCA 3.0 product design will seek to reduce and stabilize the customer’s bill ‘balance’ as much as possible, such that power generation or savings offset the added portion of the bill that goes toward capital and finance costs.

[15] Among the project categories listed, state and local laws and regulations, as well as CCA program policy (e.g. identification of specific stakeholders involved), will further define the benefits and risks for participants.

Serving low-income customers dictates that there will still be customers (as with any utility company) who fall behind or can't pay their bill. There also will also be the factor of shares customers, whether renting or owning their occupancy, deciding to relocate outside the municipality or CCA. Although the repayment for the deployment would transfer to the next occupant, a property may sit empty instead for an extended period, thus 'stranding' the equipment. A variety of shared renewables program design elements may be employed to circumscribe risks associated with low income customers, such as (1) provisions for the withdrawal or suspension of share/stake benefits for non-payment, (2) targeting of high energy intensity multi-user locations with physical onsite sharing of facilities for purposes of reallocating costs/benefits across more participants, and (3) use of municipal water and sewer bills to link payments to the occupant for purposes of transferring DER benefits and charges to new occupants.

The program should facilitate contracts and mechanisms that allow building owners to approve upgrades, and tenants benefit from lower utility bills. For commercial properties, lease agreements may stipulate that the landlord pays for all capital improvements while the tenant pays for the energy bills. The financed efficiency approach mitigates this barrier, as the landlord is not required to pay for the measures up front, and the tenant enjoys lower bills while also over time paying off the measures installed.

The customer agreements associated with asset implementation would fall into two groupings; those agreements with persons or entities with control over the site where the installation would be located (owners or tenants), and those agreements with customers who will own an indirect share in a community installation, but will not have any assets located on their property (whether rented or owned).

In general, the on-site customer agreements would cover:

a. Access for installation;

b. Customers roles and rights during any design processes, and installation;

c. The customer's rights to asset benefits;

d. The expected cost of the assets (capital and ongoing maintenance if applicable) and any program financing methods to be used to repay installation costs. This would include conditions applicable to the rights to use of power, shared savings, and billing rates associated with the financing of the assets;

Remedies for any customer default; such as repossession, or activation of any security measures involved in the transaction.

The shared asset (off-site) customer agreements would include:

a. The customer's rights to asset benefits;

b. The customer's ownership and transfer rights to a share in the asset;

c. The expected cost of the assets (capital and ongoing maintenance if applicable) and any program financing methods to be used to repay installation costs. This would include billing rates associated with the financing of the assets.

2. Onsite Shares (Opt-up)

An onsite shares arrangement involves the physical sharing of stored renewable onsite capacity among occupants and site owner:

a. Member municipality signs finance contract with DER site owner;

b. Customer signs up for CCA "opt-up" payments to repay loan;

c. CCA transfers percentage of customer's monthly premium payment to customer's equity loan account, administered by member municipality.[16]

3. Offsite Shares (Opt-up)

An offsite shares arrangement involves onsite DER energy and capacity to the site occupants and owner, with virtual sharing or bill credits to participating shares customers based on the following process:

a. CCA identifies "opt-up" DER host who is a CCA customer;

b. Host customer and shares customers opt up for into CCA DER premium;

c. Municipality signs loan with customer;

d. CCA develops project through solicitation or Job Order system;

e. CCA negotiates with CCA customer for shares participation;

[16] Because of the flexibility of the shares structure, two approaches could be taken. The simplest approach would be for the loan payment could be paid as a fixed monthly payment based on the term and size of the loan, assuming it is charged as an adder (subject to regulatory approval), or a line item on municipal sewer or water bills. If adders are not authorized, a special CCA rate (not an adder) may be employed, as per state laws, rules and guidelines, in which case it is possible for a variable payment approach based on monthly volume of kwh consumed to be employed,

f. CCA monthly transfer of percentage of payment to municipal loan accounts of host and customers according to terms.

4. Onsite Co-op Stakes (Opt-with)

Onsite cooperatives involve an agreement between site occupants and tenants to physically own a stake in bundled onsite electricity and storage packages:

a. Customers join/form building, block or neighborhood co-op;

b. Co-op applies to CCA for billing support;

c. Co-op applies to Municipality for financing (loan approval);

d. CCA subscribes customers for co-op payback rate;

e. CCA makes monthly transfer of percentage of payment to municipal loan accounts of host and customers according to terms.

5. Co-op Microgrid (Opt-with)

A cooperative microgrid involves an arrangement similar to an Onsite Co-op, but including a microgrid. Under this approach onsite members consuming less from microgrid resources are compensated for providing energy and capacity to onsite energy consumers consuming more. Under the proposed approach, municipalities will directly finance with Green Bonds and administer a Co-op Loan Account according to an approved Co-op Agreement. As with the Co-op Stakes, the CCA will make payments to the loan account according to the Co-Op's accepted agreement. For purposes of flexibility for varying conditions (particularly owner-occupied, condominiums, leases and renters), ownership models will be determined by each cooperative, but be subject to approval on a case-by-case basis[17] by the CCA and member municipality:

a. Owners sign lease agreement with CCA based on municipal finance;

b. Customer (occupant) subscribe to CCA "opt-with";

c. Integrator/operator selected based on CCA job order system and acceptance by owner and tenants;

d. May include generation/capacity sharing and neighbor automobile sharing, as desired by Co-op and approved by municipality and CCA.

6. Government/Commercial Microgrid

A government/commercial microgrid involves a virtual sharing of customers in a percentage of an offsite microgrid-enabled DER facility:

[17] Over time, a CCA/municipality may elect establish standard agreements to augment or simplify the process.

a. Up to 49% (site owner holds controlling interest) participation required;

b. Municipal agencies at own facility and consume onsite energy, shares subscribers receive virtual bill credits based on shares as per shares process described above ;

c. May include generation/capacity sharing and co-worker automobile sharing.

7. Electric Vehicle share

Electric vehicle sharing combines the protocols of conventional car sharing groups with Vehicle to Building (V2B) reverse port-based flexible storage integrated with DER:

a. CCA builds database of opt-up applicants, requests work information;

b. Scheduled use based on proximity and complementarity of schedule;

c. Focus on flexible onsite renewable storage, with cost of EV electricity offset by onsite shared use of renewable storage;

d. Home based charger, work-based charger - variety of ways to implement this, from offering free/subsidized chargers for sharing rights to free/subsidized energy for purchasing a sharing-enabled charger.

8. Electric Vehicle ownership

EV finance contracts offer subsidy bundling, finance assistance and discounted electricity rates or batteries in return for the customer's agreement to share battery capacity with neighbors or co-workers:

a. financing agreement and storage sharing agreement;

b. consumers purchasing EVs outright could be offered cheaper energy in return for sharing storage or the car with neighbors;

9. Offsite share of municipal/commercial/other large customer DER.

Sharing of non-microgrid DER facilities involves virtual or bill credit-based ownership benefits to subscribed Opt-up (renters and other small customers) through investment in local DER on public, large commercial and municipal (or other public) sites, whose accounts are physically served by those facilities. The shares participants' monthly bill credits are calculated based on cumulative equity benefits defined by the CCA share policy.

10. Offsite share of block/neighborhood cooperative

Offsite share of block/neighborhood cooperatives allows customers in a neighborhood whose buildings are ineligible for physical service by DER or microgrids to pay a voluntary “opt-up” rate or adder to receive equity benefits of an on-block or in-neighborhood DER cooperative that elects to accept its participation in the co-op’s investment pool, defined by the co-op’s CCA-accepted share agreement.

11. DERs for residential and business customers who rent account site

Apart from shares to extend virtual benefits to all, and administrative support to cooperatives “Portable” DERs for renters are a critical pathway to serving renters, who are often low-, medium-, and fixed-income residents and small to medium commercial customers.

Portability confers equity in this case because renters may bring their appliances with them, and increasingly modular renewables, storage and heating systems, once paid for, are the customer’s property and move with them.

Offering financial equity not merely to affluent building owners, but all customers, portable DERs offer the financial benefits of equity to everyone. Conversely, as described above, profound energy transformation requires reaching all people, not just the largest loads or low hanging fruit, which the current state system and market already serve, but the excluded majority, including:

a. IP Thermostats,
b. Plug load appliances,
c. EVs,
d. Modular HVAC (e.g. air source heat pumps),
e. Hot water.

G. Environmental Justice: Distribution of Benefits through Rate Structures

Apart from opt-out enrollment, the key (and widely neglected) leverage of CCAs to support energy equity is its ability to design rate structures, and to offer energy products through rates in the form of voluntary premiums, to repay customer DER loans.

CCA managers have a variety of ways to charge customer’s premiums dedicated to equity payment, from administrative adders to pay for CCA staff or renewable energy projects, to operational adders to pay for renewable energy facilities and energy efficiency measures. In some cases, adders may be bundled into rates for consumer product transparency. CCAs with utilities offering billing access or favorable metering may use them, but CCAs with limited bill access may employ member municipality water/sewer/tax bills as a repository of CCA premium equity transfers.

CCAs with limited metering or billing options may employ Software as a Service (Saas) and/or commercially available transactive energy platforms[18] and autonomous interoperable DER generation, storage and usage logging for allocating benefits among voluntary participants. Distribution utility bills may be used to collect adders, fees, and or rate adjustments, as permitted by state regulators.

1. CCA actions for energy equity through rate structure

As described in this document and the "CCA 3.0 Pathways" report, the CCA will continue to provide the lion's share of all program work, covering CCA-defined service and supporting member municipality DER customer finance and planning programs, with member municipalities providing targeted assistance and participation in an electronic data exchange. While the grid energy procurement and planning and customer interface functions are taken in house, these basic activities comprise a fraction of work performed by the CCA at first, and shrinking to a small portion of work/budget once DER development is underway, and an insignificant part of the budget once DER operations become new jobs at the CCA.

There are five categories of activities CCAs will undertake, listed below., Depending on the size of the CCA, the number of staff corresponds to full or part time equivalents of each of the five categories during the launch phase (year one to two). Depending on the number of customers served by the CCA and success of customer investment in DERs, this number may double or more during development phase (which includes establishment of administrative hardware and software systems and resources) and double or more again when significant levels of DER are operational and energy efficiency retrofit operations are underway.

These five elements are funded, defined and placed incrementally, consisting of both staff starting with the CCA manager and growing to administrative, customer service and contract management personnel, and consultants required for setup and launch of new programs or selectively outsourced specialty functions (e.g. transactive energy billing platforms or Virtual Power Plant/microgrid operators, DER battery storage and peak shaving). Contracted functions should be direct reports to the CCA Energy Manager to ensure that the CCA maintains adequate knowledge of contractor functions, maintaining best practices and evaluating whether and when to bring their functions in house through licensing agreements or other available means, both to lower costs and to build staff capacity around core agency activities of DER planning, procurement, data analysis, outreach, customer service and marketing to accomplish maximum carbon impact, The five CCA activities are:

a. Procurement from supplier(s) and design/build/maintain contractors;

b. Real-time Desk with demand dispatch, including:
- DER operation,
- State agency compliance (state regulator, ISO),
- Public relations;

[18] For definitions of SaaS and transactive energy platforms, see "Glossary of Terms" below.

c. Data, administration, communications including:

- Data management/analysis,
- Web, mail (web account),
- Back office,
- Transactive energy platform,
- Monthly calculation and payments to municipal member customer equity accounts;[19]

d. Development, contractor and agency partner management including to: collect, compile and maintain available utility, government and commercially available data; manage DER design/build/operate contracts for financed installations (municipal revenue bonds or local banks/credit unions) and demand side management contracts paid for by regulated energy efficiency funds (MA/CA); use municipal water/sewer or tax bill as allowed by state and local laws and charters; prepare municipalities' utility interconnect applications for DERs and any other regulatory filings;

e. Manage all data and technical energy matters;

f. Outreach, customer education, civil participation, including: customer service local phone number/account management, advertising, free media, local activist engagement, civic organization engagement, business organization engagement.

2. Transactional arrangements between customer, CCA/Joint Powers Entity and municipality

It is critical to convey that CCA 3.0 is a local democratic initiative that will require community effort in order to achieve a scaled climate impact, confer equity, and develop the local economy. Further, it will reach out to state agencies and local lending institutions to fund the micro-agency's launch and organize low-cost financing for customers who opt-up, -on or -with. The success of the CCA 3.0 financing will depend upon two main partners; the citizen/consumer (individually or in co-ops), and member municipalities. It requires an awakened and sustained local civic and economic participation in a Local Green New Deal and Climate Mobilization. as well as the active partnership of member municipalities.

Key administrative and community processes need to be organized in order for the optics on CCA 3.0 to have a clear pathway. These are political and policy decisions, based on public discourse and local political leadership, not technical challenges. Local political leadership must put forward CCA 3.0 for discussion and approval as a self-funded community-based redevelopment "micro-agency", with increasing local management of CCA programs based on widespread participation by members of the community.

[19] For example, the City of Cincinnati CCA (Ohio) puts information about their programs in both their opt-out notices, as well as in local water bills. See Local Power's "CCA 3.0 Pathways" section below.

Transactions occur in three forms: (1) contract between a customer (and co-op) and her municipality to finance her equity, (2) a voluntary choice of her CCA's "opt-up" (shares) or "op-with" (co-ops) product options to basic service rate; and (3) an agreement between a CCA and a member municipality. Thus, the following transactions will implement the service:

a. CCA - member municipality MOU for CCA and municipal account cooperation;

b. Municipality through:
- customer loan,
- co-op loan.

H. Usage Data and Metering

Monthly data is used for ROI forecasting and targeting for aggregate load benefits. Lower retail rates may be accomplished by targeted planning and development to reform the CCA's Load Duration Curve (8760 hour per year shape).

CCAs will employ consultants to assist with rate design. State limitations on revenue, such as New York, restrict financing by CCAs. The CCA 3.0 program is designed to overcome this barrier through member municipalities offering aligned financing programs to residents and businesses so that CCA bill payments are partially allocated to customers according to a voluntary agreement, and with transparent accounting.

The program does not depend upon Time of Use (TOU) meters on all participating customers, though DER facilities will very likely have TOU meters installed as is standard practice on medium-scaled systems. The program will employ generation and storage metering, electric vehicle meters, heat and hot water meters to provide data for equity account calculations and loan payments. The CCA will bill consumers for power consumed in the conventional manner according to conventional utility meters, settling the customer's benefits off-bill under member municipal management. Load shaping will be achieved through long-term development of targeted facilities and avoiding of aggregate load and seasonal peaking, not through short term transactions like load shifting, unless adequate metering is available and such transactions are deemed appropriate monetization strategies.

I. Security and Revenue

Utilities provide collection on power through state-regulated protocols, while municipalities provide collection on finance agreements according to its customer equity finance contracts. A number of methods may be employed to establish security, such as discontinuation/reduction of benefits, transfer of shares to the common pool, imposition of charges on water/sewer/tax bill, or conventional collection by lenders,

depending on the municipal, state or commercial underwriter the municipality (or, alternately the JPE) chooses, including the following:

1. Utility - utility bill with CCA charges imposed according to utility tariffs and state rules;

2. Municipality - DER finance contract;

3. Municipal PPAs on properties and rights of way;

4. Joint Powers Entity/Agency - hold revenue bond authority in addition to grouping municipalities in a CCA;

5. Rental owners;

6. Available state and local programs like PACE and zero-interest loans (Massachusetts);

7. Local bank financing;

8. Third party/developer “tax appetite”-based financing via the Investment Tax Credit (ITC) / assessing the transfer of ownership provisions after tax period ends is at the bottom of the stack due to non-optimal wealth retention characteristics of this conventional form of financing.

J. Customer Experience of a Universal Shares Offering

Residents and businesses in a CCA 3.0 program will be offered more than the current “standard offer” of conventional service mitigated RECs (when they do not opt-out) or an option of paying a premium above their rate for an additional purchase of RECs (when they opt in). Instead they are offered DER equity and/or DER equity benefits, by paying a premium above their rate in order to incrementally accumulate those benefits through monthly bill payments.

This approach will reproduce the general return on investment (ROI) calculated by homeowners who purchase photovoltaic systems for their homes, but not require that the customer own the property they occupy, nor only serve property owners with ideal conditions like unimpeded southwest facing rooftops. Included in this option will be bundled an energy efficiency analysis and shared savings offering to reduce load in renters as well as owners' occupancies. Depending on the customer’s status - subscription/pending, payment, and payment delinquency - customer experience of the program will fall under one of the following five stages:

1. Opt-up to shares;

2. Notification of project on line;

3. Energy efficiency shared savings;

4. Receive monthly account of paybacks;

5. Non-bill payment- suspension of share payment and transfer to water/sewer/tax department collection as allowed.

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K. Distributed Energy Resources (DER) Development Planning

DER development is driven by the CCA with the municipality as client, and customers as voluntary third-party beneficiaries. The CCA leads the development process in the following way:

1. CCA develops member municipal properties;

2. The municipality is lender and holds title until customer loan repayment is complete, after which it manages the account in relation to the CCA, which calculates the benefits defined in the municipality's customer finance contract with a customer or cooperative;

3. CCA leads municipal permitting process for residential and commercial properties;

4. CCA creates Job Order System to accommodate local contractor participation and t coordinates local labor training and placement programs;

5. Municipal financing is based on a CCA agreement;

6. Medium-scale DER projects (100kw-500kw) are financed;

7. Interconnect permitting is non-exporting.

L. Inclusive Representation

Success in engaging low-, middle-, and fixed- income residents and small- and medium-sized businesses depends upon both civic and economic participation, in a synergistic, open, encouraging protocol to facilitate high participation rates across all socioeconomic categories and customer types.

An inclusive program will depend upon a variety of engagement strategies to reach a diverse population of residents and businesses. Most critical is a deliberate strategy to encourage civic participation to reflect the program's emphasis on equity participation, as well as active citizen/business-led cooperative projects.

On the civic engagement side, a CCA 3.0 program should form voluntary citizen participation committees to work on policy questions and technical questions, contributing to staff workload and consultant work, engaging and informing the community at the local level, and reporting to the CCA governing board at monthly meetings. Advisory boards may be created to focus on grassroots engagement of neighborhood organizations and activists to encourage low-, middle- and fixed-income customers, as well as local businesses, to participate in the meetings. Issue-Advisory committees are useful to focus on key program goals such as participation of disadvantaged and redlined residents and underserved small- and medium-sized business customers, as described in Local Power's "CCA 3.0 Pathways" report.

On the economic engagement side, using customer data from the utility and member municipalities as the basis for customer engagement, the CCA manages a robust web database account management system and CCA-staffed local call center. The CCA actively engages shares/co-op consumers and DER site hosts from communities including local climate activists, civic organizations and business organizations. The CCA routinely inserts announcements in scheduled municipal billing and public announcements, conducting direct mail for data-targeted offers to customers, advertising and free media. CCA 3.0 programs will rely on a diverse platform of mostly low-cost, special access public purpose and conventional marketing, subscription and account management resources, including:

1. Database,

2. Software-as-a-Service and/or Transactive Energy Platform,

3. Utility bill rate ready/bill ready submission,

4. Monthly water/sewer bill or annual tax bill submission,

5. CCA and member municipality web account and public email broadcast lists,

6. Direct mail,

7. Speakers bureau to local community groups and business organizations,

8. Paid advertising,

9. Free media.

M. Northampton/Amherst/Pelham Energy Equity CCA 3.0 Scenario

A local CCA 3.0 program would administer a customer shares program and municipal cooperative program to willing member municipalities and help them to organize a financing program with their residents and businesses. The financing program is based on revenue bonds, or state-mandated zero-interest loans,[20] or other private sources such as local banks, cooperatives and credit unions. The financing enables DERs development among municipal buildings, campuses and adjacent multi-residential and commercial buildings, as well as single-family homes, home businesses and farms. A municipal billing system, Software-as-a-Service web-based portal and/or Transactive Energy Platform would then be administered for generation and storage metering. A universal offering includes shares and home/business energy efficiency for any customer, and cooperative shares for customers who actively organize a cooperative with their neighbors in the building, on the block, or in the same neighborhood, using both off-site virtual and on-site sharing adders, fees, or rates, as approved by the Department of Public Utilities (DPU).

National Grid and Eversouce will provide a local CCA with monthly billing data histories for all customers under Massachusetts DPU rules and described within the relevant tariffs of the IOU regarding municipal aggregators.

Below find a business plan scenario that Massachusetts could undertake to meet the equity goals of a CCA 3.0.

1. Size, Load Diversity, Equity in a CCA 3.0 Business Plan

Load diversity, rather than size, considerations are critical for CCA 3.0, particularly the importance of including all municipal electricity (and natural gas or heating oil, and increasingly EV fleets and -charger) accounts as participating customers in the community-wide program. This increases the size of the aggregation from within, creating a lower cost of service to the community in this way, but more importantly by adding a complementary schedule of load to opt-out enrolled customers, who are predominantly residential and small commercial users. For the same reason, diversity as well as potentially significant scale will be added by actively soliciting participation by other “opt-in” commercial and industrial users, other state and federal government facilities, universities, agricultural or other large energy users.

This is true under conventional retail service such as the Cape Light Compact JPE uses, but even more so under “direct retail” procurement under which the CCA provides collateral and works with a certified retailer to participate transparently in wholesale procurement planning, in the manner that Harvard University currently does.

[20] They are part of the utility energy efficiency programs. They are issued by private lenders, using private-sector underwriting criteria. The interest is paid down to zero using energy efficiency program funds. Importantly, the EE program administrators determine what the loans can be used for. The general rule is that, since the interest is paid with EE funds, the loans can only be used for things that are part of the EE programs. HEAT loans cannot be used to finance PV or other forms of distributed generation.

Load diversity/density is key to the economics of CCA 3.0 in several ways. First by "automatically" balancing loads: daytime and night-time loads, weekend and weekday loads, winter peak and summer peak loads, and finally schedulable/predictable (e.g. water and sewer system pumping facilities) versus non-schedulable/fluctuating loads, larger loads being as a rule more schedulable and predictable than smaller loads. Load diversity within the CCA (and between CCAs, such as an industrial town with a residential town) creates a more constant and predictable level of demand in the aggregation's power and capacity procurement undertakings "passively" through the inclusion and participation of all/most of the customers in a community. In this way, system energy becomes less expensive, creating greater savings margins within which to be able to offer DER ownership/shares products with net savings for the customer.

Second, load diversity/density through inclusive participation enables DER technologies to reach a diverse set of energy users to physically share onsite, on-block and in-neighborhood DER facilities, whether microgrid sharing, HVAC/hot water sharing, or EV sharing. Residential and commercial neighbors of municipal properties, being enrolled as CCA customers, may themselves develop or be offered DER packages in which facilities are used during the day by municipal or commercial customers, with residential customers using them during evenings, mornings and weekends. Thus load diversity makes it possible to implement non-exporting DERs that "transform" from energy use, through subtractionality rather than the import-export arrangements that predominate today, unlocking the horizon for DER penetration and decarbonization.

Third, a final form of load diversity/density is participation of low income, middle and fixed income customers in the CCA service and 3.0 ownership options, in order to deepen the level of community investment and resulting scale of decarbonization. Fourth and finally, the "sweet spot" for sizing a CCA 3.0 program is small enough to be authentically local for the resident, but also large enough to be impactful in the region and thus influential among the Commonwealth's 150 municipalities who are CCAs, with many more in formation. As the "carbon impactfulness" criterion of this project would determine that regional replication of the program needs to occur, a Northampton/Amherst/Pelham agency could ostensibly offer participation to communities throughout Hampshire County, or even perhaps Franklin County; but beyond that such growth would not necessarily achieve greater energy discounts, and might face governance issues through dilution of mission.

In terms of governance, energy democracy or what USDN calls "procedural equity" or "inclusive accessible, authentic engagement and representation in processes to develop or implement sustainability programs and policies," the local identity and accessibility of this program is a part of the sweet spot formula, underscoring the need for the JPE to be local. By engaging the JPE as partners as well as members, municipalities can fill the gap for a countywide JPA or two-county JPE, but there are limits to stretching "local" beyond a county. Defined not only in terms of retail market criteria, but governance (and actual policy outcome) criteria, the 3.0 "sweet spot" lies on the smaller side in order to have JPE board meetings within a short drive, so that citizens in the JPE municipalities' territorial boundaries may conveniently participate in monthly JPE meetings, participate as members of advisory committees, petition as customers for improvements, pursue cooperatives, and request actions from the JPE governing board. Regional mega-agencies are less democratic than local ones. And

under USDN's "structural equity" category of equity requiring that the CCA 3.0 JPE be accountable for economically benefiting historically disadvantaged communities,[21] CCA wide geographic dispersal also must be regarded as a distinctly negative factor, by reducing the likelihood of an effective engagement of these communities to benefit from the program beyond the discounted low-income rate discounts they already get.

The JPE can also coordinate or partner in various ways with other CCAs to help them implement similar programs under separate contract. That being said, in order to spawn regional replication, it is sensible to seek to invite all municipalities that endorse and agree to participate in the manner defined in Northampton/Amherst/Pelham's founding JPE documents to apply to the JPE for admission, to educate them and assist them in making decisions about participating and partnering as municipalities to implement 3.0; and to either admit those who so elect as members of the JPE, or otherwise assist them in forming their own program with neighboring municipalities, depending on the advantages or disadvantages of the case (to CCA economics or otherwise), as the JPE board so determines at any given time.

CCA 3.0 implementation does not change the general rule about the minimum threshold size of a CCA to obtain discounted rates from an energy retailer, though it does create new opportunities for smaller CCAs.

First, whereas retail energy markets require a minimum scale from a municipality or group of municipalities to be viable, DER developers do not require the same scale: one thousand customers might be small to a power retailer, but is "large" for a solar-plus-storage or microgrid developer. Economic viability is based upon the return on investment on project equipment and development costs, not discount margins on wholesale and retail energy trading.

Second, like CCA 1.0, CCA 3.0 costs may be recovered from program revenues: for procurement functions, through collection of administrative and operational adders from customers enrolled through the opt-out process; for financed DER facilities, through collection of an increment of a customer's voluntary "opt-up" loan repayment; and for "Part B" energy efficiency programs, through allocation of a margin of this funding to cover CCA administrative costs related to energy efficiency. Thus, 3.0 does not introduce any minimum requirement for CCA size, making it more, not less, viable for smaller aggregations.

Extremely large CCAs tend to both lose their local identity and, not being local, command less loyalty from customers and are thus less effective in customer and community engagement: a key factor in "opt-up" DER development compared to the passive customer model of CCA 1.0.

A particular advantage of starting smaller with a few towns with established shared goals, is governmental. As indicated in Local Power's "CCA 3.0 Pathways" section, the primary historical barriers to CCA program development to 2.0 and 3.0 was lack of internal capacity within the CCA. Having a clear governing board mission and goals is a

[21] Angela Park, "Equity in Sustainability: An Equity Scan of Local Government Sustainability Programs," Urban Sustainability Directors Network, September, 2014.

necessary ingredient for giving CCA managers adequate direction and empowerment to take necessary actions to create this capacity. To the extent that a CCA grows larger, the governing board's consensus will logically decrease, and to the extent it is geographically dispersed, a corresponding loss of clear direction is a significant risk to meeting program goals. To the extent the program is intended to lead or set an example for others, the JPE mission, articulated in its Joint Powers Agreement but also subject to ongoing interpretation by alternating board members, should be carefully protected by the founding members, including the screening of interested municipalities according to their agreement to the agency's declared mission.

2. "Mock Up" Northampton/Amherst/Pelham CCA 3.0 Business Plan

The operational and development business model for CCA 3.0 is generally articulated in Local Power's "CCA 3.0 Pathways" report. Below articulates a more actionable and specific plan of business actions (1) by Northampton, Amherst and Pelham to commit municipal resources, define the mission of and create a JPE; (2) by the JPE once formed to establish operations and govern; and (3) by CCA staff and contractors to help the JPE and member municipalities launch aspects of the program in a timely manner.

The following sequence of recommended actions will launch a CCA 3.0 program. Dates are estimated for purposes of contextualization, and do not represent an actual proposed schedule. The actions start with Northampton setting the example by making a commitment of (1) program launch funding, which could be a gift or loan recovered from a CCA administrative adder; and, if it so chooses, (2) collateral or funds kept in a lockbox account to provide security on procurement to enable the "direct retail" wholesale procurement articulated in Local Power's "CCA 3.0 Pathways" report. Northampton will draft the Joint Powers Entity Agreement, which will similarly require other cities wishing to join the JPE to contribute funds to startup and collateral requirements.

The sequence of actions are as follows:

- City of Northampton Council declare climate mobilization based upon the climate emergency, decide on funding one year of startup costs with two FTEs/employees and two FTEs/consultants to prepare implementation of a Local Green New Deal program for launch in 2020;
- City of Northampton draft JPE language, outlining the activities and authorities of the JPE, approve governance decision of one vote per city without weighting of votes using a modified form of the Cape Light Compact to reflect CCA 3.0 strategy, including plug power/HVAC and hot water and electric vehicles, microgrids and fuel switching. There should be provisions for member municipalities to make various resources available to the JPE, such as Green Bonds/credit assistance, inclusion of municipal accounts and municipal properties for DER technologies, use of municipal water/sewer billing and property tax platforms for voluntary customer DER loans, services offering state Zero Interest Heat Loan and C-PACE options. There should be a disclosure of City of Northampton funding dedicated to the JPE operational costs for two years, and a proposal for contribution to this existing funding for CCA startup costs, as well as deciding the direct retail requiring a source of collateral to

conduct procurement, and last but not least, a GHG reduction target and/or "UN energy transformation" target;

- City of Northampton adopt and join Northampton/Pelham/Amherst Green New Deal JPE, including a vote on appointment of mayor or councilor or selectman to JPE Board for a one- to two-year term;
- Amherst decide on funding startup costs (see above), and join JPE, with two members constituting a quorum and full legal status to lead implementation of the program;
- Pelham join by vote of the town selectmen;
- JPE hold first quorum meeting to confirm startup budget from municipal contributions, create an exploratory committee authorized to develop the program including hiring a Program Director (PD);
- JPE announce invitation to other Hampshire or Franklin County municipalities providing adopted legislative language to join;
- JPE accept or reject responses for a period at its discretion, followed by annual schedule for the consideration of respondents;
- JPE adopt necessary legislation to implement program as defined;
- JPE exploratory committee recommend interim program director to take over day to day operation of the program with full authority to implement the programs under a protocol of JPE governing board votes;
- JPE brief the PD on the budget, authorize negotiation of a contract with a "direct retail" ESP for approval, give direction on use of member municipalities' infrastructure and resources, and receive report and request for additional permissions from PD;
- PD present direct retail ESP for approval;
- PD prepare Implementation Plan for adoption by JPE and submission to DPU, followed by 6-8 months of ongoing dialogue with state agencies and utilities;
- PD prepare draft Energy Plan for use with DPU "Part B" Energy Efficiency Funds administration;
- PD collect data from the utilities, municipalities, and publicly available datasets governmental and commercial, build central CCA database, and use it for analyzing applications for 3.0 non-exporting, sharing developments;
- PD apply for funding from CEC and other state and/or federal resources, as well as any private grants or assistance that may be available, engage local banks and credit unions, and DER target customers based on data analysis;
- PD present agreements with member municipalities for agency cooperation and dividing roles per CCA 3.0, for approval;
- PD present Finance and Development plan to JPE for approval;
- PD hire Phase 1 staff authorized by the approved Finance and Development plan;
- PD present proposed "direct retail" supply plan and portfolio, state compliance documents for approval;
- PD launch "Green New Deal" residential/business account, data analytics and customer service /informational website linked at member municipality web sites and all scheduled mailings to residents and businesses;
- First offering to customer wait list;
- PD launch 1-800 call center and customer engagement on member municipality billing and public communication and scheduled mail platforms;
- Solicit DER developers for candidate sites based on data targeting;

- Start engagement of DPU for Energy Efficiency Funds;
- PD present Payment System and municipal data sharing and loan payment agreements for Shares and Cooperatives, for approval;
- PD hire Phase 2 staff authorized by the approved plan;
- PD launch signups for cooperatives and “universal shares offering”;
- PD negotiate launch and data exchange protocol with utility;
- PD launch any independent data/billing platforms;
- Launch opt-out commodity electricity service;
- Launch opt-in large commercial/industrial opt-in service;
- Authorization of Green Bonds and other financing;
- First tranche of DER projects on municipal properties for shares participation;
- PD present Job Order System and any new RFPs to board for approval including interoperability -related specifications for microgrids, metering and telemetry;
- PD present first tranche projects to Job Order and Requests for Proposals participants;
- PD present job training and placement partners/contractors to engage for approval;
- Launch “Part B” energy efficiency funds administration;
- Full Scale “Green New Deal” through UN 2030 target.

3. How a CCA 3.0 Business Plan is Possible in MA/JPE

The Legislature recently passed an “Act Modernizing Municipal Finance and Government (Act)” in 2015, which among other things allows governmental entities to join together and exercise any of their common powers and duties within a designated region (a Joint Powers Entity or JPE). Governmental entities sign a Joint Powers Agreement (JPA) that governs the operations of the JPE. Only two municipal entities are needed to form a JPE. CCA member towns and counties are all parties to an Inter-Governmental Agreement (IGA) under the authority of G.L. c. 40, §4A (the IGA Statute), one of the documents that governs the operations of the JPE, articulating matters such as JPE goals and purposes, election of officers, appointment of directors, procedures for meetings and voting.

A city, town or a regional school district, a district defined in G.L. c. 40, §1A (e.g., fire, water, sewer, etc.), a regional planning commission, however constituted, the Hampshire council of governments, a regional transit authority under G.L. c. §161B, a water and sewer commission formed under G.L. c. 40N or by special law, a county, or a state agency defined in G.L. c. 6A, §1 is able to form a JPE.

Initially, the JPE would be responsible for all the CCAs affairs, and directly cooperate with member municipalities based on the provisions of the intergovernmental agreement.

A JPA is authorized in a city, by the city council with the approval of the mayor; in a town, by the board of selectmen; and in a district, by the prudential committee. The chief executive officer of a city or town, or a board, committee or officer authorized by law to execute a contract in the name of the governmental unit will execute a JPA. The Act does not require a Town Meeting vote to join a JPE.

Each member of the JPE appoints a director to serve on the JPE's board of directors. The JPE is also a public employer, and the board of directors may hire staff to carry out the purposes of the JPE. Subject to certain limitations, the board of directors must also appoint a treasurer and business officer for the JPE.

The Act provides that a JPE is a separate public entity with the authority to:

- Sue and be sued;
- Sign contracts and other instruments necessary to exercise its powers;
- Make, amend and repeal policies and procedures;
- Receive and expend funds;
- Apply for and receive grants from the Commonwealth, the federal government and other grantors;
- Apply for state, federal or corporate grants or contracts to obtain funds to carry out its purposes;
- Submit an annual report to each member governmental unit with a detailed audited financial statement;
- Employ staff;
- Borrow money;
- Is subject to the Uniform Procurement Act (and its exemptions), contract for goods and services, purchase or lease land, buildings and equipment; and
- Has any such other powers as are necessary to properly carry out its powers as a body politic and corporate.
- The Act imposes financial control requirements for audits, reporting and accounting.
- The JPE must establish and maintain a budget.
- Annual audits are to be distributed to its members and to the Department of Revenue. Annual reports to members are also required.

4. Legal References for Massachusetts JPE Actions and Authorities

Statutes governing referenced activities are the following:

- A city, town or a regional school district, a district defined in G.L. c. 40, §1A (e.g., fire, water, sewer, etc.):
  https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40

- Section 1A: District defined

  Section 1A. Except as otherwise expressly provided, the word ''district'' as used in this chapter shall mean a fire, water, sewer, water pollution abatement, refuse disposal, light, or improvement district, or any other district, howsoever named, formed for the purpose of carrying out any of the aforementioned functions, whether established under general law or special act.

- A regional transit authority under G.L. c. §161B:
  https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXII/Chapter161B

- A water and sewer commission formed under G.L. c. 40N: https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40N

- Or by special law, a county, or a state agency defined in G.L. c. 6A, §1 is able to form a JPE: https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6A

- The above document refers to this definition of State Agency here: https://malegislature.gov/Laws/GeneralLaws/PartI/TitleIII/Chapter29/Section1

''State agency'' or ''state department'', a legal entity of state government established by the General Court as an agency, board, bureau, department, office or division of the commonwealth with a specific mission, which may either report to cabinet-level units of government, known as executive offices or secretariats, or be independent divisions or departments.

5. A JPE's programmatic costs for a self/quasi-self administered CCA 3.0 program

During the program development phase, in the first couple of years, most of the JPE's costs will go to consultants creating the program, but as program elements come into place, these outsourced functions will be in-sourced under staff management, with consultant budgets only lasting as long as new program elements remain to be created. Apart from a small staff starting with two and building to eight, all other functions of the CCA 3.0 program will be born by the private sector, with their competitive services being paid by customers and at their risk, with JPE staff limited to a project or contractor management role, which will be at least half of staff capacity. As facilities are built, additional sources of funding, whether from projects or the state (Part B funds, CEC grants), additional staff may be afforded to expand the program's carbon impact, but in any case, the program is self-funded, requiring only start-up phase support when the newly created JPE has no independent source of funding and will require active assistance of the founding municipalities.

CCA 3.0 JPE's program costs will go through a series of phases, starting small based on limited resources, achieving stability once the program launches, building up with customer engagement, and growing to full scale based on increasing revenue sources from development, state CEC grants, and Part B energy efficiency funds.

The first "startup" phase from the creation of the JPE to the launch of services has the smallest level of cost, consisting of a Program Director, who will be responsible for implementing the program under JPE board authorization, billing/communications/call center staff, and up to 2 FTE consultants. Prior to launch of the CCA service and other local programs, funding will be needed in the form of general funds or loans (many CCAs in California used loans, including bank loans and loans from individuals), to pay for these staff to do the work required to launch the program, and these funds should be committed by municipalities when they create/form the JPE.

A second "operational" phase of the program will add engineering staff, but by this time funding will come from administrative and operational adders displayed on customer bills, as described in previous documents, with some additional engineering costs

recovered next in the build-out phase of the project, after customers have opted-up and CCA shares and co-op premium payments to generate an additional administrative increment payment on the municipal customer DER loan monthly repayment allocation. Finally, in the late operational phase and early build-out phase, Part B Energy Efficiency funds, if available will provide additional funding to support an expansion of agency activities, foreseeably as many as ten to twenty staff, at full countywide scale.

Thus, the ratio of costs for self administration to the amount of funding being brought under stewardship are very modest. At full scale, depending on whether the JPE remains in the three towns or grows county-wide, a robust CCA program could easily have eight or more FTE staff.

The following is a back-of-the-napkin straw man proposed funding scenario:

- Funding would be provided as a loan from general funds of one or more participating member municipalities or local lender to the CCA;
- $300K/yr. for two years for implementation, policy and regulatory staff and consultants;
- $50K per year for two years for financial and legal advisor;
- Half of administrative adder half a mil at commencement of services to support two additional full time staff members;
- 10% of annual surplus revenue to grow into a full time staff of ten or twenty depending on size.

This is a mockup only, and reflects a full program implementation, including paying for someone to pursue administration of the Part B Energy Efficiency Funds at the DPU, a time-consuming activity requiring significant expertise. As the startup costs are quite modest prior to revenue generation and scaled to the CCA itself, a Northampton/ Amherst/Pelham CCA should be able to repay a $750K loan within the first five years of operation, which many CCAs have done earlier.

2. CCA 3.0: LOCAL PATHWAYS TO CLIMATE EQUITY

By Local Power LLC

A. Background and Introduction

This is a report on the boldest Green New Deal-type leadership in America today, which is being led by municipal governments, as it was also in the “old” New Deal of Franklin Delano Roosevelt. It is called Community Choice Aggregation (CCA). This report describes where CCAs have gone in terms of transforming the energy business, what they have achieved recently, where they are today, where they see barriers, and where they are trying to go. CCAs are at the forefront of those confronting the 10-year time scale for a transformation of the energy sector, set by the UN secretary general in March of 2019. This is about how U.S. municipalities will transform the energy system from the bottom-up, under the dedicated umbrella of CCA.

Articulated over the past decade and now coming to scale on the west coast with three gigawatts of CCA-committed in state renewables, CCA is now mature and underway with some third of California’s investor-owned utility customers under service and over forecasted in the next few years. CCAs have signed long-term renewable energy contracts totaling over three gigawatts, with 19 CCAs launched in California since 2010, growing to include more than 160 towns, cities and counties with 64 having a 100 percent renewable or clean energy policy as their default energy program. A UCLA study found that “CCAs have had both direct and indirect effects that have led to increases in the clean energy sold in excess of the state’s RPS” and are now the largest driver of renewable energy growth in the state. Most CCAs are already well ahead of California’s ambitious Renewable Portfolio Standards (RPS) targets, offering almost double the 33% by 2020 requirement at competitive rates. Given the launch of 10 new CCAs in 2018, the CPUC estimates that CCAs have an immediate RPS procurement need of approximately 6,900 GWh beginning in 2020. And by 2021, at least 65% of RPS procurement must come from long-term contracts.

While Massachusetts CCAs have innovated, they have not come close to this level of impactfulness. However, this may be changing. All around the country, particularly in Massachusetts and New York, many CCAs with higher aspirations are focused on the urgency for climate action as their first priority, and are increasingly recognizing the requirement of social equity. These two program criteria address both social justice concerns of community investment, and equally important, of physical C02 reduction impact. There is a recognized need to go beyond incentives and credit schemes of the current market to engage a sufficient portion of the population to reach the volume of consumption necessary to achieve *scale, acceleration*, and *endurance* of carbon reduction: the essential criteria by which to judge climate policy.

Such municipalities, focused in the northeastern CCA region, have partnered to produce this timely report. Building on 25 years of CCA development in all active markets, this paper articulates a third version of CCA, or "CCA 3.0” which adds a remaining final layer of CCA program design that is being pursued by many CCAs in different forms, but remains to be implemented in a scaled and replicable way. CCAs have evolved from (CCA 1.0) rate discounts in the mid-1990s with accelerated

renewable energy credit mitigation levels in the late 1990s; to (CCA 2.0) rate parity with accelerated regional renewable energy development in the past decade; to (CCA 3.0) rate parity with accelerated development of local (in-city, in-county) renewables, energy efficiency, and microgrids in the past couple of years. The most recent wave of CCAs are focusing strategically on behind-meter technology deployments, and enlisting customers directly or through shares arrangements as investors in diverse categories such as solar, storage, energy efficiency, and demand management, known as Distributed Energy Resources (DERs).

This final leap involves not so much generation technology as much as the integration of any number of renewable technologies with electric vehicles (EVs) and heating/hot water appliances in buildings, through new forms of *customer engagemen*t and *cooperation*: customer ownership, solar shares, and partnership with local dedicated customer cooperatives. At a system level, this leap involves a shift in the design of renewables and energy efficiency technologies from an incentive-based, subsidized import-export model of technological integration to an avoided-cost based, load-eliminating model of technological integration.

This new approach moves away from the boilerplate green energy business products of deregulated energy retailers and utilities. The standard formula of (1) Renewable Energy Certificate (REC)-based “legal” mitigation of conventional fossil portfolios on the one hand, and (2) Net Energy Metering (NEM) or Feed in (FIT) tariffs compensating solar systems. Like RECs, NEM/FIT tariffs employ an import/export model. Whereas RECs legally “green” a physically unchanged, carbon-intensive energy portfolio, NEM/FIT tariffs leave customer grid demand unchanged, and subsidize and configure onsite solar to function as energy generators rather than grid demand reducers. Both leave the physical system unchanged, and thus achieve little in carbon reduction. In contrast, CCA 3.0 is a commercialization pathway transitioning quickly to widespread in-CCA DERs based on municipally administered sharing, and employing not NEM, which is capped due to voltage regulation issues from exporting, but rather a *non-exporting* distribution utility interconnect tariff, for which there are no such impacts, nor caps, nor the regulatory basis or precedent for caps: an unimpeded pathway to scaled energy localization.

This project connects the recent past to the present and near future of CCA, tying together the disparate chords of CCA across the states over the past quarter century, drawing on a CCA 1.0 survey in 2010 and CCA 2.0 survey in 2016, and updating the recent achievements of CCAs based on new interviews of thirty-five leading CCAs and state regulators. Reflecting on the initiatives and barriers experienced by recently innovative CCAs, the report seeks to analyze CCAs dispassionately, and frankly articulate where CCAs need to move for purposes of rapid decarbonization. Because electricity, transportation, and heating (building heat/hot water) cause some two-thirds of greenhouse gas emissions in terms of sectors, CCA 3.0 encompasses all three, shifting the focus of local program design to and staffing to engage customers, through shares and cooperatives, employing formerly underutilized resources of municipal governments: inclusion and retro-commissioning of municipal buildings, use of municipal billing and communication systems, and municipal management of customer DER finance.

This is energy democracy itself. CCA 3.0 is a national project to articulate an advanced form of Community Choice Aggregation focused on large-scale, accelerated municipal, residential and local business investment in local energy resources is *accelerated, enduring carbon* pollution, and its primary method is *distributional equity* through customer finance and ownership. The strategy outlined herein builds on the accomplishments of 1500 municipalities under CCA laws adopted by Massachusetts, California, New York, Ohio, New Jersey, and Illinois, starting under the simple supply model of CCA 1.0 in the late 1990's and achieving California's development-oriented CCA 2.0 over the past decade. CCA 3.0 will take this to the next level: into the community, behind the meter, non-exporting, shared, co-invested, and co-owned.

1. Historical context

Electricity can best be understood as a "rental" model of energy under which users pay for hours of electrical capacity - the kilowatt-hour (kWh) - which reflects, through financialization, the combustion of fossil fuels. The kWh created a vessel for financing and vertically integrating the electricity industry. Today, the ultimate results of this model of consumption of energy fuels are (1) climate crisis, and (2) energy poverty: the continuing drain of each American's scant surplus wealth to perpetuate debt service on fuel-burning machines.

During the first few decades of the electricity industry in America in the late 19th century, the municipal initiation and ownership of local Direct Current (DC) electricity networks presented a spectacle of democratization and decentralization of energy. Indeed, the invention of the electric vehicle predates gasoline vehicles by nearly 50 years, and manufacturing by over ten. New York City's first taxi cab service was all electric, using easily removable lead acid batteries to refuel until the private sector stepped in to privatize and vertically integrate energy systems.

The advent of Alternating Current (AC) enabled the centralization of massive, remote generating stations far from the buildings that use them, and opened the way for the vertical integration of the industry through mergers and acquisitions. In the early years of the Cold War, the electricity industry campaigned successfully against municipal utilities, staving off congressional efforts to nationalize the utilities after great holding companies collapsed in the financial crash of 1929 (leading to the Public Utility Holding Company Act), promoting a state regulatory model that still largely prevails in this country. Utilities in effect used this regulatory system to stall the transition to economically viable renewable energy technologies for decades until the late 20th century. The automobile and oil industries similarly blocked, co-opted and shelved electric vehicle development, and the heating fuels industries resisted renewable thermal technologies and electrification despite their cost-effectiveness.

In this sense the current trend toward energy decentralization is but a return from Nikola Tesla to the original energy model of Thomas Edison, driven by technological miniaturization. In spite of industry opposition, actions that included government initiatives, imports from less captive markets overseas, and activist/affluent consumer demand were sufficient to support manufacturers of small, fuel-free renewable energy technologies that can be owned by consumers ("appliances"). Meanwhile, the personal

computer and telecommunications industry developed cheaper, better batteries and control systems, as well as the software, inexpensive switching technologies and ubiquitous IP network capacity for appliance interoperability without expensive utility hardware infrastructure. Today the so-called Internet of Things (IoT), whose manifestations are Virtual Power Plants (VPPs), Distributed Energy Management Systems (DERMS), and microgrids, is here to stay. These sub-platforms for commercialization pathways require only a “middleware” platform to rationalize, bundle, finance and deliver a wide array of onsite generation, storage and control technologies to all residential, business customer classes.

The ultimate effect of the energy industry’s long delay of de-monopolization has been to protect and repeatedly recapitalize an obsolete infrastructure against increasingly cheap and interoperable onsite energy technologies. Today, some utilities are sandbagging their increasingly untenable competitive situation by perpetuating customer captivity through the imposition of new charges, requiring approval of governor-appointed state regulatory commissions. These new charges are non-bypassable monthly bill fees and transmission and distribution charge. Meanwhile, the introduction of deregulated markets at the federal and state levels in the 1990s introduced an initial degree of competition and renewable energy development, within which Community Choice Aggregation was introduced as a vehicle for customer participation in the aggregate, and has out-innovated the other models for both rate discounts and green power/energy efficiency. CCA presented a truly historic platform for an entirely new energy business model based on the mutualistic local municipal organization of energy demand, rather than merely the supply, as the foundation for design of renewable and energy efficiency resources.

By the turn of the 21st century, most energy efficiency measures were already cheaper than coal-fired power. By 2010, wind power was cheaper than natural gas-fired power, and in recent years even photovoltaics, the holy grail of energy technology (requiring no transmission and long-lasting with little maintenance), has dropped below a dollar per watt, making solar power cheaper in some states than grid “system” power. While transformation is now both technically and economically feasible, the growth of these technologies in states that lack CCA laws remains behind a wall of regulatory protection on the one hand and uncompetitive, underperforming deregulated grid power/gas retailers on the other.

From an historical perspective, whereas 1990’s-based REC, NEM and FIT policy models were designed to incentivize early market development of renewables, the climate crisis calls a rapid energy sector transformation. A new model is needed to support transformation, and to catch up with recent technological developments. Green tech electricity, -transportation, and -heating, formerly separately fueled in separate industries, are now combining into interoperable generation, control and storage systems. In the transportation sector automation technologies have created an efficient platform for controlled charging. Meanwhile, in the building heat and hot water industries, where technological change has been delayed longest, IP-enabled learning thermostats and heat pump technologies are economically poised to make heating/hot water with oil and natural gas a thing of the past. All that stands in the way of a transformative energy transition today is being in a position to standardize deployment of these technologies as interoperable resources, to effectively engage customers to

purchase them, and make financing available to all customers. As municipally run demand aggregators, CCAs are uniquely positioned, uniquely aligned for the purpose, and present unique resources to administer this new model: unique access to data, unique name recognition and trust of consumers, and unique authority to plan local development.

Today, the "grid" problem is the last card that monopoly utilities have to play against a multitude of more efficient, customer-ownable, and radically less polluting energy technologies. Created by the energy industry, it is the body of state regulators who have become the last line of defense for the industry's 19th century infrastructure, protecting utilities' revenue streams against consumer "defections" to solar, while safeguarding utility control of ratepayer surcharge funds for funding customer-owned energy efficiency measures. In the name of protecting the "average" ratepayer, in some cases regulators have authorized utilities to impose whole new categories of connection fees on owners of photovoltaic (PV) systems, and "minimum bills" that charge consumers for unconsumed power. In effect, this is a tax on any bill savings from using solar photovoltaics and other renewable DER systems. With regulatory sanction, utilities punish consumers with one hand for doing the right thing in the name of protecting "their" remaining captive customers, while with the other, define solar programs paid by all ratepayers to predominantly benefit affluent building owners, with renters and low income consumers implicitly excluded from participation. Unpopularity results from contradictions that both harm solar economics and make solar seem ineffective and costly.

As the penultimate platform for deployment of grid-connected but operationally autonomous systems within a community-wide retail energy service, CCA 3.0 could be called the "wireless" model of energy. In this respect CCA is the natural successor to the vertically integrated utility, answering climate crisis with opposite-facing technology, and a *new deal* for customers. As the conventional incremental approaches to decarbonization of recent decades, such as portfolio standards, sustainability indexes and incentives, have failed to achieve carbon impacts on a scale that is commensurate with the magnitude of the problem, it is increasingly clear that, in order for rapid decarbonization to occur, this kind of planning entity is required. Moreover, traditional rate-based investment is not a sufficiently large platform for the scale of capital that is necessary to transform energy in the eleven-year time frame the United Nations Secretary General indicated on March 28, 2019, to avert "irreversible damage." New revenues are needed, which only engaged customer investment in cost-saving measures, with a compelling return-on-investment, can provide: a virtuous cycle.

Climate justice is not in this sense merely a concession to disadvantaged populations, but a universal societal call for coordinated co-investment across residents, businesses and government. From this perspective, transformative climate policy is focused not merely on decarbonization of energy, but "climate equity." It replaces centralized, polluting resources with local renewable resources, and it changes the century-long electricity business model in which energy bills amount to a life-long lien on personal wealth by an absentee-owner. It is time for a new era, in which monthly energy bill payments are repurposed into a capitalization of personal wealth: a shared investment in local and renewable energy equity. As the UN Secretary General stated in December,

2019, there is increasing consensus among central banks, financial sector and business community to solve climate change, but "what is lacking is political will."[22]

2. Defining energy equity

In an U.S. electricity industry whose ownership is dominated by Wall Street-traded utilities, traders and fuel extraction companies, energy bills are a key factor in social inequity because Americans pay their energy bills *before every other bill*, making energy utilities and suppliers the "first lien" on a society's wealth.

In the conventional energy utility milieu, the concept of energy equity takes the form of welfare, or charity. The conventional utility service model defines the "equitable treatment of customers" that is required by state regulation as state mandates that prohibit charging small customers more for energy than large customers, and require tariffs that subsidize rates for low-income residents. Meanwhile, all customers, including disadvantaged populations, are required to pay for state DER funds on monthly bills. While ostensibly well-intentioned, conventional utility DER programs are nevertheless a fundamentally unequal and regressive treatment of the majority of energy users. Thus, while such policies represent a baseline *mitigation* of energy poverty in one way, they also impose new costs and deny equity to the majority in another way. It is safe to make the general statement that, when measured as a percentage of income/assets, low-income consumers with subsidized rates and fuel assistance still pay more for energy than more affluent consumers. Just as NEM and FIT mitigate rather than eliminate pollution, the conventional equity model is really mitigation of distributional inequity, not equity itself.

Thus, the discounted-rent model of utility "fairness" remains a bulwark of energy poverty for Americans. Moreover, the funds paid to energy companies by low-income consumers represent in many cases the entirety of their scant and declining surplus wealth. As most (and increasingly more) Americans fall under this category, the provision of energy is both a fundamental cause of social inequity, and also, if transformed through customer access, an umbrella, or *a platform for building new social equity.*

3. "Equity Benefits" paradigms are in flux: low rates vs. low bills

To understand the nature of energy equity, one must unpack commonly used criteria of consumer *benefits* as they have been defined under regulated utilities.

a. **Lower rates, higher bills** As mentioned above, the regulated utility definition of customer "benefits," broadly imitated by deregulated retail energy suppliers, is the benefit of lower energy supply *rates*. Most energy programs focus on achieving lower rates, and regard the lowering of rates as the defining consumer

[22] "Secretary-General's Press Encounter Following Ceremony to Mark 25th Anniversary of UN Global Service Center in Brindisi," 19 December 2019: https://www.un.org/sg/en/content/sg/press-encounter/2019-12-19/secretary-generals-press-encounter-following-ceremony-mark-25th-anniversary-of-un-global-service-center-brindisi

benefit of competitive supply. However, the "supply" component of most electricity bills is only a fraction of the amount due: between a quarter and a third of an average customer's electricity bill. Thus it is not uncommon for customers with *lower* rates to suffer from *higher bills.* Moreover, utilities have responded to deregulation by persuading many state regulators to increase the amounts charged for energy delivery (transmission and distribution), in addition to creating new volumetric surcharges.

b. **Higher rates, lower bills** But people don't actually pay rates: *they pay bills*. Where customer-owned energy technology is in play, high rates often do not correlate with high bills. For example, California is notorious for having on average the highest rates and the lowest bills in the U.S., because of energy efficiency measures that reduce consumption. Moreover, many onsite Distributed Energy Resources (DER) products involve payment of a rate premium or supply charge that results in (i) reduced ongoing net monthly bill payments, and (ii) additional, cumulative future monthly bill payments.

4. Vicious cycle of inequity: disadvantaged populations paying to install solar on buildings of the affluent

With some state governments ordering the utilities to create Net Energy Metering (NEM) Tariffs in the mid- to late-1990s, customers who installed solar photovoltaic arrays and other behind-meter distributed generation began to receive monthly bill credits. These tariffs suffered from extreme inequities, as non-building owners (disadvantaged populations) were being made to provide funds that were primarily received by building owners (the relatively affluent). Moreover, buildings with DER installed under this equity benefit program also appreciated in value faster than homes without DER, making low income homeowners suffer a secondary injury to their real estate equity. A decade or more later, some states ordered the utilities to facilitate Virtual Net Metering (VNM) for multi-tenant properties for those accounts owned by the same entity, and while this improved the conditions of inequity it did not solve them. Most recently, Community Solar presented a pathway for inclusive ownership, but is everywhere stuck in pilot mode (and awaiting a socially inclusive platform such as CCA to realize its potential):

a. **Caps present an inherently limited horizon** Exporting Net Metering, Virtual Net Metering, and Feed-in-Tariff configured systems cause voltage regulation issues on distribution systems, requiring distribution upgrades that are paid for by all customers, including low-income customers who don't participate in solar programs.
b. **DER redlining** Because of these costs, utility net metering caps severely limit the horizon of allowed exporting interconnect permits for DERs, resulting in a regulatory ghetto of captive energy dependency from which disadvantaged populations can never escape.

5. How CCA's shifted the paradigm

When the U.S. electricity and natural gas industries were deregulated by the federal and many state governments in the 1980s and 1990s, the idea of "choice" figured

prominently in legislative nomenclature. Buoyed by the success of federal telecommunications industry deregulation of the early 1980s in bringing about technological innovations such as fax machines (which the phone monopolies had prohibited) and wireless telephone and paging networks, Democratic and Republican policymakers in D.C. and many states alike embraced the policy view that mandating individual energy choice would itself create energy competition, and that the magic of the market would deliver both technological innovation, lower energy bills and greener energy for all.

In this sense, energy deregulation contained the vague promise that paradigmatic transformation of energy would ultimately follow. Certain members of the Massachusetts General Court, however, were skeptical that (1) small consumers would benefit, and (2) renewable energy would prosper in a deregulated market. Therefore, the Commonwealth's 1997 electric industry restructuring act,[23] which deregulated the market, also authorized municipalities to use Community Choice Aggregation as leverage to ensure that those declared public policy goals were realized. Ohio followed, and when when California's deregulated market fell into an historic crisis, it too adopted a CCA law.[24] The California "second generation" CCA law focused more "advanced" CCAs on developing renewable energy and installing energy efficiency locally. This was called "CCA 2.0."

Over the past quarter century, while the results of electricity and natural gas deregulation have as a rule been disappointing for both consumers and the environment, CCA has proven to be the "great exception." CCA has saved consumers billions of dollars in energy rates, and continues to set records for renewable energy supply levels.. However, the *transformation* of the energy business model by CCAs, such as that recently called for by the United Nations, began under a decade ago, and has developed dramatically in scale and scope just in the past three years. Meanwhile, the vast majority of the 1500 or so U.S. cities under CCA in the nine states with laws authorizing CCA, do offer lower rates with often above-Renewable Portfolio Standard (RPS) supply portfolios. However, as a rule, most maintain conventional supply-side business models and thus present conventional value propositions to their customers, under which equity is defined as discounted "rates" per kilowatt hour, and "renewable" content is defined as mitigation, not physical greening, of their generation portfolios, through purchase of Renewable Energy Certificates (RECs) above state-mandated compliance levels. While RECs are often very cheap and make their purchasers legally green, their actual impactfulness is questionable and temporary, compared to the physical and enduring offsets, for instance, of physically located solar arrays, heat pumps and electric vehicles.

As this national survey concludes, widespread outsourcing of CCA management functions to energy brokers and energy traders has tended to favor a financial- or "legal-" versus physical-definition of renewable energy that does not impact the actual greenhouse gas emissions of their CCA programs. Outside of California, whose CCA 2.0 model involved insourcing of procurement to micro-agencies in order to physically decarbonize CCA energy sources, broker- and retailer-run programs perpetuate the

[23] Section 247, Chapter 164, 1997.
[24] AB117, Chapter 838, 2002.

utility model of recurring revenues, paid directly by margins on CCA retail energy sales volumes. Typically lacking the skill and interest in developing local renewables, energy brokers and traders have steered their CCAs toward procurement of credits and incentives rather than physical development and physical carbon reduction. These "products" reduce neither the carbon intensivity of their energy sources, nor the energy consumption levels of their clients' customers. While some CCA 1.0 programs are "legally green," or even "100 percent renewable" their actual carbon emissions remain, thus, literally unchanged. For communities that wish to use CCA as a platform for climate mobilization, the national survey makes clear that insourcing is necessary to fill the gap, and realize the potential of CCA 3.0 to dramatically reducing actual community-wide carbon emissions at rate parity.

As the story of CCA itself attests, public purposes must be publicly mastered, publically planned, publically negotiated, and publicly managed: only then will "the market" serve public purposes. In recent years, due mostly to citizen activism centered around climate change, CCAs in California have replaced the purchase of RECs by procuring renewable energy directly, first from existing wholesale suppliers, and second from renewable developers. CCA 2.0 accomplished this by eliminating middlemen and taking procurement in-house. In these cases, the CCA business model is changing in the sense that a de-financialization of renewables is taking place, and recognition is becoming more widespread among CCA executives and governing boards that location matters. Energy efficiency reduces more carbon per dollar than any form of renewable generation. Behind-meter renewables reduce more carbon per kilowatt-hour than grid-connected renewables. "Local" renewables offer substantively greater ecological and economic benefits than regional renewables, and regional renewables greater than renewable energy imported from afar. When it comes to achieving real carbon reductions in the United Nation's urgent schedule for energy transformation, being merely legally green simply is not good enough. Actions, not merely transactions, are required.

6. CCA 1.0: simple, limited

While the nation's first CCA, the Cape Light Compact in Cape Cod, Massachusetts, adopted an energy efficiency-centered business plan, the vast majority of early "1.0" CCAs focused on short-term customer rate discounts, and limited their green programs to "mitigations" by dedicating a portion of the savings to the purchase of RECs.

7. CCA 2.0: local development & lower carbon grid power

In California, Bay Area CCAs led a new model of CCA focused not on rate discounts but rate stabilization. They accomplished this by shifting from the "retail" model in other states in which energy traders played the energy product integration and financing role to a "wholesale" model. In the wholesale model, CCAs take control over integration and diversify their suppliers, and negotiate power purchase agreements (PPAs) with renewable energy developers, whose projects are substituted for grid power: a physical energy transition. Requiring suppliers to "meet-or-beat" the utility's rate with higher levels of renewable physical supply, San Francisco, Marin, Sonoma and other California

CCAs have successfully launched programs whose green power model is not based on legal mitigation by REC procurement, but physical wholesale sourcing and new local and regional renewable energy investment and development.

8. CCA program risks: *distributional* inequities for consumers

While a paradigm shift has occurred in CCAs' concept of renewable energy from mitigation to development, CCAs are just beginning to change their ideas about "equity."

Moving beyond the CCA 2.0 program design to one focused on social equity, we must recognize the ubiquitous inequity of both the conventional utility model and the more recently created policies to promote local renewable DERs. In order to avoid the risks of inequity in future, CCA programs must avoid the pitfalls of its own innovations:

a. **Low-income residents** Low-income residents are systematically excluded from financed DER products, and are priced out of premium renewable grid power products.
b. **Housing renters** Renters are systematically excluded from ownership of financed DER products, including exporting tariffs and subsidies aligned to building owners, and Property Assessed Clean Energy (PACE) financing programs, for whose voluntary first lien-based low-interest financing only building owners, by definition, are eligible.
c. **Non-participating customers secondary harm** Electricity ratepayers who do not have DERs are harmed a second time by the fact that market-sited DERs *do not reform* their CCA's annual demand pattern ("load duration curve"), with "grid" benefits sold to third parties. For this reason, the CCA's peaking- and capacity-based cost-of-service will remain unreformed, its customers facing higher future bills that disproportionately impact the poor, with or without subsidized rates.
d. **Energy efficiency surcharge on ratepayer** Ratepayers in CCAs that do not administer the energy efficiency surcharge funds locally are harmed by higher electricity bills because the funds collected from ratepayers are not equitably distributed to all ratepayers, such that funds underserved customers are *required to pay* on their utility bills are often not invested in their homes and businesses or even in their neighborhoods, reducing neither bills through less consumption nor their rates through community-level load reform.
e. **Small residential and small-medium business consumers** All customers of CCAs that separate municipal accounts outside the CCA's aggregated load, or that do not offer service to large commercial customers in their jurisdictions, are harmed by higher energy bills that result from smaller and less balanced day/night-time load shapes. This practice is in fact very common among CCAs outside California.

9. CCA program risks: distributional inequity for workers

CCAs are not just programs: they consist of municipalities whose residents and businesses are not merely consumers, but workers, entrepreneurs, taxpayers, and investors. Ensuring distributional equity in a CCA program is not limited to *consumer* equity. The multiplier effects of community wealth retention have been repeatedly demonstrated, while the U.S. trend of outsourcing services and the energy industry concentration through mergers and acquisition "mania" of recent decades, make this equity element of CCA 3.0 palpable. Unless CCAs take deliberate measures to design their 3.0 programs to engage local residents and local businesses, the result will be yet another layer of unintended "energy poverty" in their communities:

a. **Local workers** Local workers can be harmed by a lack of local job training and placement leading to the creation of jobs *elsewhere.*
b. **Local entrepreneurs** Local entrepreneurs can be harmed by procurement processes that make it difficult or impossible for small and mid-size companies to participate, resulting in the award of contracts to non-local companies.
c. **Local investors and lenders** Local investors and lenders are harmed by non-local financing, and local bank borrowers are harmed because the money they spend as CCA customers is being exported, and is thus not being re-circulated in the community.

10. CCA 3.0 is an *unprecedented* umbrella for climate equity

CCA 2.0 has demonstrated how CCA is an umbrella for climate action. By bringing many disparate, underfunded, under-leveraged, un-scalable local municipal renewable energy programs under the integrative authority of a CCA platform, these municipalities have exponentially scaled up the impactfulness of all of those efforts. This unprecedented leverage applies even more to distributional equity. The synergistic power of CCA to augment up-scaling of climate equity may be boiled down to the following strategic advantages that are not otherwise available to municipalities on their own, or indeed *any market participants*:

a. **Data** Unlike any market participant other than the utilities themselves, CCAs have access to otherwise confidential utility customer end-use meter data for all eligible consumers in their jurisdictional boundaries, and thus the ability to interpolate this data with other municipal datasets that reveal the nature of energy demand and resources within their communities. Meanwhile, municipal DER programs do not have this data any more than commercial market participants. This data is a goldmine for DER deployment, because it enables CCAs to (1) understand the nature of the aggregate CCA load in order to create a high-level cost of service model and DER integration strategy for the community based on: local demand patterns, land use, infrastructure and renewable resources, and (2) because usage data enables CCAs to analyze, identify, and tailor appropriate DER technologies for each customer based on their monthly bill payments, patterns of use, forecasted energy costs, and other publicly available data sets.

b. **Contact** Engagement of customers in energy cannot be achieved through a single point of contact, but requires sustained education, repeated offers of services, and contextualization to elicit widespread interest and enthusiasm. Consisting of municipal governments, CCAs have both their statutorily defined channels of communication with their customers through opt-out notifications and to a varying degree monthly utility bill pages or line items, but also separate municipal platforms. Scheduled mailings, public notices and free media, phone calls, web sites, and media contact with residents and businesses represent major channels for DER engagement that market participants simply do not enjoy. By adding an on-bill presence to water and sewer mailings, tax mailings, and other public notice platforms, CCAs are uniquely positioned to present a "green new deal" to the community.
c. **Revenue** The opt-out automatic enrollment mechanism defines CCA, and represents a major advantage formerly only enjoyed by monopoly utilities and municipally owned utilities: a predictable revenue stream with which planning and investments can be made.[25] Moreover, CCAs in California have emerged in recent years as more creditworthy than the utilities themselves, and now represent over half of the entire pipeline for solar investments in the state for the next five years.[26]
d. **Control** Significantly, CCAs exercise local control over rate design and rate-setting that even regulated utilities, which must seek approval for any one category of procurement under a separate regulatory proceeding, lack. Control of revenue constitutes an existential opportunity for DERs, because DERs can compete on a level playing field on the platform of a neutral, publicly interested party which is empowered to authorize voluntary rates and fees for participating customers, who wish to acquire ownership benefits or physical possession of DERs based upon monthly bill payments.
e. **Trust** Studies of DER systems in the U.S. have identified the cost of acquiring new customers representing *half or more* of the cost of installed DER systems. One cause of this substantial cost is the inaccessibility of end use meter data to market participants (which CCAs, holding this data, can also help address), but a second key cause is consumer burnout. The prevalence of aggressive marketing practices and fraud in the energy industry - both among retail energy traders and among solar finance companies - has hardened the hearts of many consumers toward green power marketers. As in the case of municipal recycling programs, municipalities have a natural role. Authentic public benefit programs by CCAs have a much higher credibility in the community than commercial pitches can have, and present a unique vessel for customer engagement in DERs that do not otherwise exist in the market. As this report indicates, a CCA program design should build on this precious remnant of public trust in otherwise tarnished energy markets.

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[25] "As CCAs take over utility customers, local renewable generation emerges as the next big growth driver," *Utility Dive*, October 8, 2019. https://www.utilitydive.com/news/as-ccas-take-over-utility-customers-local-generation-emerges-as-the-next-b/564422/

[26] "Total Addressable Market for California Community Choice Aggregators, GTM Research, 2018." http://www2.greentechmedia.com/communitychoice?_ga=2.262657868.1976236757.1582291226-25465473.1582291226

B. Reaching Climate Equity

At the highest level, CCA 3.0 development is best described as local investment in Distributed Energy Resources to reduce local grid demand, through the mutual effort of the community and participating customers, utilizing municipal planning, in order to provide energy equity to those defined in the community as the "redlined majority:":

- Low-, medium- and fixed-income residential customers
- Public housing residential customers
- Small- to medium-sized businesses customers
- Renters and public housing residents
- Consumers without credit
- Family farms and home businesses

1. CCA 3.0 program design

An energy equity-oriented program is designed on the principle of *inclusivity*, not merely by serving low income residents, but (1) by *de-segmenting* the local energy market so that all CCA consumers enjoy the same combined market power to define and receive 3.0 products and services, currently offered primarily to large commercial, government, and homeowners; and (2) by replacing *premium* based bill-increasing green energy products, principally only affordable to the affluent minority, with *equity:* bill-decreasing ownership-benefit products that generate customer wealth, and therefore appeal to all, including majority low- to medium-income, customers, whose participation is necessary for the scalability of climate impact.

CCA 3.0 not only offers but emphasizes distributional equity pathways in its program design: financed DER products for renters, job training and job-creation within the CCA, actively hiring companies locally or in the immediate region, using local financing, and targeting DER technologies and local sites for load reform so that all members of the community benefit economically in the form of lower energy costs. CCA 3.0 is a shift from the import-export model used in utility tariffs, to a sharing and ownership financing model for the redlined majority.[27] Virtual sharing, which is facilitated administratively through DER account credits, and the *real* sharing of in-building, on-block DERs, are the basic engagement keys to reach the otherwise underserved majority of electricity, natural gas and gasoline consumers.

2. Renters and low/medium income residential customer equity benefits

The key barriers to DER ownership by low, medium and fixed income Americans are (1) lack of home ownership, (2) lack of capital to invest, and (2) lack of creditworthiness to borrow. Thus, a 3.0 program design will incorporate measures to (1) provide or arrange financing sources, (2) fill the gap through the facilitation of flexible or "virtual"

[27] Dr, Eugene P. Coyle, "Price Discrimination, Electronic Redlining, And Price Fixing In Deregulated Electric Power," The American Public Power Association, January, 2000.

participation in DER equity, (3) provide security for collection based on building occupancy, and (4) tailor suites of "real" equity products that have shorter payback periods. Program design measures would include:

a. **Financing** The commercial DER financing market is designed to serve the affluent and large businesses, and PACE financing is de facto limited to building owners. In order to arrange financing for installations and measures that benefit low income customers, CCA 3.0 programs will work with member municipalities to provide revenue bond financing through rapidly growing "green bonds," or else partner with local financial institutions to fill the gap.
b. **Universal shares offering** A cornerstone of CCA equity is DER sharing. While commercially available "community shares" or "solar shares" programs, facilitated through utility Virtual Net Metering (VNM) tariffs, enable customers to purchase shares in or subscribe for bill credits from a solar array, these tariffs are capped in every state where CCA is authorized, imposing similar limits to conventional net metering described above. Moreover, as these programs are largely marketed by private, for-profit, absentee-owned developers, subscription rates are incremental and therefore not particularly scalable. In contrast, a universal shares offering by CCAs have exponentially greater potential to engage customers. Unlike market participants including utilities, CCAs also enjoy independent capacity to facilitate shares arrangements for their customers through rate design and on-bill or off-bill customer-transaction platforms.
c. **Water/sewer billing platform security** The principal on-premises or "real" DER lending barrier for most Americans, is an inadequately secure bill collection profile for commercial lenders, in cases of customer non-payment or change-of-occupant. As mentioned above, PACE attempted to solve this problem by creating security for public financing that is based on a first-priority property tax lien, but the result has been (1) excluding the majority of Americans who are not property-owners, and (2) continuing legal and political challenges by mortgage lenders like Fannie Mae who object to losing first priority in a loan default. In this regard, CCAs possess key advantages that include (1) a greater degree of security in the form of opt-out enrollment of new occupants, (2) ancillary service contracts (e.g. Demand Response) that do not change with re-occupancy; and more significantly, (3) the ability of CCA member municipalities to provide a separate billing platform, available for voluntary CCA customer DER financing charges on municipal water and sewer bills.
d. Modular energy efficiency product suites A key barrier to financing on-premise or real DERs for low income residents is the long payback period associated with certain energy measures. To the extent that the payback on a measure takes decades to complete, the lender's credit risk is elevated. Thus, CCAs can develop packages of shorter-term energy efficiency measures for which any customer who pays a utility bill may be eligible for financing.

3. Small and medium-sized business customer equity benefits

Smaller in number but even greater in climate impact than non-affluent residents, the other major neglected market segment for DERs is the small- to medium-scaled business customer. These are typically local businesses that depend more upon a local

customer base for their success, and are the natural participants and partners in community shares programs. CCAs can effectively engage this sector by tailoring and targeting products to serve their particular energy and community participation interests:

a. **Owner-occupied commercial buildings as shares host sites** Small and local business owners who own the buildings they occupy are natural partners for Community DER shares generation sites, for a variety of reasons: (1) they often depend upon local and even neighborhood residents for their business, and recognize the benefits of community and neighborhood "partnerships" to establish customer loyalty; (2) they are often large energy users whose pattern of use is schedulable and/or predictable, making them optimal sites for DERs; (3) many have high energy tariffs and bills that show positive returns on investment by DERs; (4) they are secure off-takers of energy from the point of view of lenders; (5) their properties often contain multiple accounts in an isolable "campus" environment, creating opportunities for DERs sharing with tenants.
b. **Resiliency for energy-critical businesses** Businesses with refrigeration, heating and cooling needs are energy-critical in the sense that they suffer losses during power outages. For this reason, DER products that enhance onsite energy security, such as microgrids, are a critical engagement pathway to resilience, rather than cookie-cutter NEM systems, which shut off during outages.
c. **Modular DERs for renters** As is the case for residential renters, DERs that commercial renters can take with them are more engaging products than building-integrated DERs, which effectively belong to the owner during changes of tenancy.

4. Farmers and home business customer equity benefits

The following onsite DER technologies are appropriate for financing at family farms:

a. **Renewable water pumping;**
b. **Methane digesters;**
c. **Agricultural biomass generators;**
d. **Farm building renewable heating and hot water.**

5. Local labor and energy businesses equity benefits

The participation of local labor and energy companies in CCA DER build-outs is a challenge for both CCAs and local residents as well as businesses under standard municipal procurement processes, which typically include both long sales/decision-making cycles and burdensome local contracting requirements. As

East Bay Community Energy (EBCE) in California has made a special commitment to local hiring, job training and good paying jobs, adopting local job creation and customer equity goals in its Local Development Business Plan. EBCE works with local unions to develop the workforce that will be needed for wide-scale DER deployment, and have point awards for local firms who bid into their RFPs.

a result, formal RFP processes often *de facto* favor larger, typically non-local companies, which in the absence of palpable incentives are less likely to hire locally. Moreover, while local community colleges and state universities often offer training courses and degrees in related fields, they typically lack the resources to offer placement opportunities for their graduates. CCA 3.0 program designs can fill the gap to encourage local business and labor participation. The following CCA 3.0 program designs can facilitate the employment of residents and contracting with local energy businesses:

"We have a commitment to prevailing wage, local hire, and local training. We need, for instance, to train people to do things like installing electric water heaters. We are working with training programs and unions to create the workforce we will need." - *Nick Chasset, EBCE CEO*

a. **Local labor training and job placement** Coordination with local educational institutions and labor unions to train DER installers.
b. **"Job order system"** Administration of a pre-qualification and job order system for DER installers and integrators.
c. **"Local preference point awards" in CCA solicitations** Inclusion of point awards for local labor and subcontractor sourcing in CCA solicitations.
d. **CCA RFP (Request for Proposals) points for in-county companies** CCA solicitations can include a preference for bids by local companies and/or companies that commit to employ local labor, and may award points for them in bid evaluation scoring criteria.

The **Cape Light Compact** and Nantucket, Massachusetts have developed "strong relationships" with local contractors who develop DER for their customers. "This alignment is financially and logistically beneficial to both parties."
-Maggie Downey, Administrator, Cape Light Compact

6. Public safety equity

In a grid failure event, resiliency tends to be inequitable. As the City of Boston's recent MIT microgrid study indicated, the lower-income populations are most vulnerable when utility infrastructure fails, with fewer opportunities to leave the city, stay at a hotel, or travel to relatives. Lack of energy resiliency becomes, during severe flooding or other extreme weather, an acute and menacing instance of inequity for the majority who have no recourse.

As storm events become more powerful and frequent due to climate change, many U.S. communities are seeking opportunities to provide greater energy resiliency to vulnerable neighborhoods, through the development of onsite energy in both the public and private sectors. In particular, microgrids are an emerging technology for providing safe areas during extreme weather events.

C. Description of national CCA survey

1. Interviews with 35 innovative CCAs and state agencies in six U.S. CCA Markets

This report builds on previous national surveys of CCA (2010) and CCA 2.0 (2016) across the states that have active programs in place, but also includes some three dozen interviews conducted with the managers of some of the nation's most innovative 3.0-type programs, and also with state government officials about some of the barriers they have encountered. In cases where CCA managers or staff were lacking or unavailable, we interviewed and/or corresponded with CCA consultants and brokers who were involved in innovative CCA program designs and implementations.

Thus, the analysis contained herein presents an update on the pathways and barriers to "advanced CCA" based on recent experience, including CEOs, staff, and consultants to the following entities:

a. *Massachusetts* - Somerville, Nantucket, Brookline, Arlington, Melrose, Cambridge, Newton, Lowell, Cape Light Compact, Newburyport (broker), Massachusetts Clean Energy Center, Metropolitan Area Planning Council, Cape and Vineyard Electric Cooperative
b. *California* - Redwood Coast Energy Authority (Humboldt County), Clean Power Alliance (Los Angeles County), East Bay Community Energy, Monterey Bay Community Power, Valley Clean Energy (Yolo), California Public Utilities Commission
c. *New York* - Westchester Power, Tompkins County/Ithaca, Ulster County/Kingston, New York Public Service Commission, Brooklyn Microgrid
d. *Ohio* - Athens / Southeast Ohio Public Energy Council, City of Cincinnati
e. *New Jersey* - Maplewood-administered regional CCA, Montclair, Sustainable New Jersey
f. Illinois - Metropolitan Mayors Caucus

2. For individual CCA case studies and stories - See Appendix A

D. Analysis of national CCA survey

CCA takeaway: parts without the whole Our updated survey shows, on the one hand, an extraordinary and rapid diversification of CCA program designs toward decarbonization, localization, DER integration, and an emerging modicum of distributional equity. On the other hand, it also shows that those CCA programs with 3.0 components appear to be permanently stuck in "pilot mode." Our survey identified over fifty innovations, but rarely more than a few in any particular CCA program. These findings are both encouraging in that they demonstrate the legal, technical and economic viability of many different 3.0 pathways, but also frustrating in the limited scale of impact that comes from a limited degree of integration of parts, isolation of program components and inadequate administrative infrastructure. Our survey indicates that the limitations of these exciting new programs have *less to do with technology or markets*, as one might assume, and more to do with under-articulated policy framing and inadequate administrative resources that result from inadequate levels of public participation in CCA governance. Thus, *distributional equity* is being limited by inadequate *procedural equity.* A greater dose of energy democracy is therefore needed to overcome the inertia of local governments unaccustomed to major transformational opportunities, to alert local political leaders to what is potentially a "very big deal."

The **Cape Light Compact** in Massachusetts built its internal capacity upon the successful claim to its statutory right to administer energy efficiency public goods charge ("Part B") funding under the landmark Massachusetts CCA law. The funding it now administers, which totals *annually ~45 million dollars*, provides the main source of this agency's operational funding. As a result, Cape Light Compact participates alongside investor-owned utilities in the state level planning process for the use of those funds, and are able to propose innovative programs tailored to the Cape Cod's unique needs and local priorities. The potential exists for Massachusetts CCAs to pool their engagement efforts and otherwise work with the Cape Light Compact to administer these funds in order to reduce associated administrative and legal costs.

In particular, the following main factors currently limit 3.0 programs to pilot scale: (1) permanently limited program access to capacity and funding to expand program scale/diversity; (2) insignificant customer subscription levels in 3.0 components; (3) lack of citizen/civic participation in CCA governance weakening CCA board leadership/direction to staff; and (4) failure by CCA programs to engage municipal agency and financing resources**.**

1. CCA lack of internal capacity

As a rule, the inadequacy or absence of a CCA administrative infrastructure (e.g. billing systems, database systems, communication systems, internal expertise) is the primary limiting factor, not any lack of available commercialization pathways, in particular:

a. CCA staff funding Outside of California, CCA programs are under-funded and have few or no staff. In California, a long-term planning-oriented wholesale model and *a priori* focus on physical energy transformation led to upfront funding of micro-agencies of ten to fifty staff based on loans or general funds. Outside California, where CCAs have launched within the narrowly defined mission of short-term discounts, CCA programs do not receive the priority attention of elected officials who are unwilling to dedicate general funds to pay for staffing of programs that offer fewer benefits, have enjoyed much less air time, and are thus unknown to most voters. Under this "backroom" model, brokers have been the preferred parties to launch CCA programs, because no up front resources are required, performing initial program work unpaid until ratepayers are charged through a bill or adder once service begins.

In California, many state and local agencies, like regional Air Quality Districts and the California Energy Commission, are providing millions of dollars in grants to CCAs to build out EV charging infrastructure. **Monterey Bay Community Power** alone claimed ~$6M for new EV infrastructure. **Marin Clean Energy** is offering up to 100% rebates for hardware and installation of new EV chargers at workplaces and low-income or market-rate multi-family residences.

The "cheap" launch strategy is arguably penny wise and pound foolish, committing precious program surpluses to brokers for the convenience of launching without making important governance decisions, such as funding for staff. Such CCAs often lack the ability to fund staffing years after the program is underway, and often indefinitely. Thus, many CCA programs that manage tens or hundreds of millions of dollars per year have few or no staff to lead development and educate decision-makers. Moreover, while the choice of brokers to manage the launch process can be a convenience, this pattern has tended to remain fixed, with brokers becoming the only funded advisors to non-expert staff or elected officials. A kind of intellectual captivity is discernible in frozen program designs, with brokers establishing their position collecting volumetric fees based upon the repetition of the same program design: a classic chicken-egg problem, in which the 2.0 or 3.0 outcomes never hatch.

It is noteworthy that all CCA programs with 2.0 and 3.0 elements have funded staff members who drove the DER program process with decision-makers. This is a basic lesson in good governance and energy democracy. Because it is the principal cause of other internal capacity gaps, the failure of CCAs to fund the development of internal capacity, and to wean themselves from technical dependence upon brokers, must be regarded as the most obvious programmatic barrier to CCA 3.0.

Nantucket, Massachusetts' Energy Manager staff was funded by Green Communities Act funding, but this source has since been removed, leaving many programs without state support options.

b. Failure to access member municipal government infrastructure and resources
One of the key failings of CCAs that limit or block their 2.0- and 3.0-type aspirations is intellectual and technical siloing[28] of energy procurement from other municipally administered DER or utility programs.

Because most of the barriers to DER development are mainly transactional, CCA member municipalities' existing customer service, communications and billing resources, from direct mail to water/sewer bills, tax bills, and public email lists, are key commercialization pathways for engaging customers.

Siloing procurement from DER programs is as typical for regional multi-town CCAs as single town CCAs. The use of brokers itself is a foundational siloing, because CCA (elected) decision-makers and any municipal staff are uninvolved in discussions with energy retailers, and thus insulated from knowledge of the factors of procurement that could be augmented by the use of other municipal resources to meet program goals. Moreover, brokers serving CCAs with 3.0-type aspirations tend not to "push" their clients to develop internal resources. This is because they operate under a business model in which their turnkey self-sufficiency avoids competitive exposure, and ensures continuing recurring revenues based on minimum change, as well as delays or uncertainty that represents potential slowing or problems with contract approvals.

The City of Cambridge, Massachusetts has chosen to move away from a RECs based strategy to focus instead on new direct investment in DER development. Initially, municipal sites are prioritized because they represent that simplest development path, but they hope to expand to private sites that might host community solar arrays.

Silicon Valley Clean Energy (SVCE) has launched what it calls its "Innovation Onramp" which pays applicants to develop new strategies for decarbonization of the CCA.

Newton, Massachusetts has installed solar arrays on twelve municipal facilities and will develop seventeen more. The process of site-selection and RFP development included extensive public input and negotiation.

As a result of siloing, CCA s tend to imitate utilities, assuming they must use the same utility tariffs and communications platforms that conventional utilities employ. Thus, many CCAs mistakenly assume that because they cannot secure regulatory agency permission for access to utility bills or utility cooperation in billing conventions (such as consolidated billing or rate ready billing), they therefore cannot implement DER or equity programs which depend upon specialized customer billing. Yet, in most cases their own member municipalities do already administer water/sewer bills, property tax

[28] On information silos and the problem of functional siloing, see for example, *Phil Ensor, "The Functional Silo Syndrome" (PDF). AME Target: 16 (Spring 1988).*

bills, scheduled direct mail and public email lists that could be employed in conjunction with CCA programs. Similarly, many CCA administrators assume they require conventional financing, when municipalities already possess revenue bond and other public financing resources that CCA 3.0 programs could augment for the residents and businesses that receive CCA service. Typically CCAs operate for years without ever collecting analyzing legally available utility customer meter data sets and member municipality datasets that are key to defining and offering with cost-effective DER products. The result is a failure of CCA programs to employ locally available resources to scale up under-resourced, eternally pilot-phase DER deployments.

c. Siloing of CCA staff from CCA decision-makers The politics of CCA can be challenging because the elected officials appointed to vote on CCA program changes, such as funding, resources staff authorizations, or important policy decisions, do so for programs that have been inadequately articulated in local community meetings and press. Participatory CCA governance, and procedural equity, is required to educate decision-makers and empower staff. Going down the chain from brokers to staff, there is here another degree of separation between energy program managers seeking to develop DER components, and the governing board members, such as town and city councilors, whose direction is required to empower staff to innovate, but which ultimately depends upon community involvement to inform and energize elected officials to bold action: the virtuous cycle of energy democracy.

Many CCAs in California, including **Monterey Bay Clean Power** and **East Bay Community Energy**, are building up substantial reserves with a view to opening up financing options for their programs in the future. That conversation often includes a discussion of **Green Bond** financing. **Sonoma Clean Powe**r is investigating the use of bond financing to roll-out EV infrastructure. **Lancaster Clean Energy** (California) helps connect eligible customers with a variety of PACE finance firms. Different providers offer varied RE/EE financing opportunities, and the CCAs relationship to any one is not exclusive.

Thus, another chicken-egg problem is discernible, particularly in the many cases where CCAs are launched behind the scenes. With little to no local citizen participation, public awareness is stifled; and even in cases where participation is strong during launch, but declines upon launch, a vicious cycle of sorts typically ensues. Limited to internal broker/staff input, CCA governing boards that make decisions with little citizen participation tend to be very slow to accumulate knowledge and make decisions. Without apparent public interest, local media give scant attention in front-page news. The programs often seem replicable of the incumbent utility, with public notices limited to announcements of contract awards, changes in rates, or perhaps mention of the percentage of RECs. A vicious cycle of civic boredom, weak policy goals, bureaucratic siloing begets an un-compelling value proposition, which in turn begets consumer disengagement.

Too often, policymakers, staff and even activists who drive CCA formations have a tendency to believe that controversy is the stuff of failure - and in order to win the votes

for a launch, mistakenly decide to defer "difficult" decisions that might rouse political opposition during the formation process. Unfortunately, such decisions, concerning funding and commitments of resources, defining of goals or targets, or definition of thresholds, are the very discussions that engage the public. Taking a backroom consensus approach to formation, while avoiding opposition, also forfeits public support for meaningful goals. Such activists and officials miss the single critical opportunity to awaken members of the community to come to their support, and also, later, to engage as customers. The result is an empty room with no motive or clear mandate for bold climate action.

A lack of democratic culture within democratic institutions must be regarded as an internal barrier to acting boldly for the climate. Because CCA outreach and marketing lack municipal communication infrastructure, the result is that there is little to no citizen awareness of CCA, or DER programs, in the very communities being aggregated. Moreover, the broker/retailer outsourcing model used by the vast majority of CCAs outside California results in a commercial rather than community "face" of the program. Unlike California's CCA 2.0 programs, which have dedicated web sites, do not refer inquiries to outside companies, directly handle customer service calls, and include product engagement features and account-changes, even the greenest Massachusetts CCAs feature websites are only informational in nature, refer customer inquiries to brokers, and account changes to energy retailers. Brokers and retailers present a spectacle that is substantively similar to other private "products" on the market, rather than the attention-getting, historic initiative that CCA must be in order to engage communities and achieve the kind of carbon impact that California has proven it can.[29]

East Bay Community Energy leads California in actively managing its own customer utility data. EBCE receives AMI data on a next-day basis, and has built a platform to provide automated cost of service projections for their customers. The also manage their own MDMS data interface with the distribution utility. This level of tracking allows, amongst other benefits, for EBCE to know how their DER programs are performing -- whether or not, for instance, DR programs have a cumulative benefit for the customer and the CCA portfolio overall. "We needed a data system capable of doing more than the options available on the market," said Nick Chaset, CEO. EBCE initially hired a nearby municipal utility as a data management partner to help with the Meter Data Management System (MDMS) interface with PG&E and accessing the Advanced Metering Infrastructure (AIM) data on a daily basis for the previous day. EBCE has have built a data management platform in-house to help with operations. All EBCE rates and AMI data are programed in, and it will predict cost of service for every customer. EBCE did a bottom up analysis of every customer and their forecasted cost of service.

[29] The vast majority of CCAs run by brokers don't even have a dedicated web page for CCA, leaving this entirely to their broker: for example, New Bedford, MA: https://masscea.com/new-bedford/ ; among some of the greener MA CCAs, pages are informational, referring to broker pages which therefore top Google searches: Cambridge, MA: https://cce.somervillema.gov/ ; or Somerville, MA:

2. CCAs not engaging their customers as investment partners

Sonoma Clean Power in California has launched an "Early Adopter" energy efficiency program for residential and commercial customers to adopt a wide range of free measures (not including installation), from lighting to smart appliances. In exchange for these free technologies, early adopters offer the CCA the ability to track their energy uses so that more widespread programs can be tailored to real-world

Engagement of customers as investment partners is a multi-stage process that starts with engaging them in the governance process as citizens. CCA programs with 3.0 goals need to articulate those goals during formation in public hearings, make meaningful statements of intent, and commit resources to demonstrate the seriousness of their resolve to a populace that is unaccustomed to innovation or meaningful climate action from their municipalities, and therefore need to be given clear notice that "something special" is happening. Specifically, customers need to understand that the opportunities being offered are part of a community program with a public purpose, akin to curb-side recycling programs, as opposed to merely new consumer choices. Citizen participation is thus key to consumer engagement, and a clear message of purpose around *distributional equity* key to effectively engaging citizens in governance for *procedural* equity.

Unlike large centralized renewable plants, Distributed Energy Resources are installed in people's homes and businesses. While CCA provides an unprecedented platform for customer engagement through the opt-out automatic enrollment of customers in a community-wide energy portfolio, DERs and equity products depend upon residents and businesses knowing about an opportunity, responding affirmatively to an offer, and making commitments to pay a special rate or fee to provide financing of the (DER) product.

Apart from civic participation in governance, customer engagement is achieved through many of the other neglected resources mentioned above: a robust, CCA-administered website, inserts in municipal direct mail and billing platforms, public email lists, and the like. But customer engagement rests upon the foundation of offering customers DER products that are suited to their needs; to provide the "middleware" between commercial parties and the customer so that they can make simple choices under the umbrella of a trusted third party (the town); and a seamless interposition of this product platform upon the veneer of the customers monthly utility bill payment. Too many CCAs neglect these functions, present their programs as conventional green energy programs, and treat DERs as a mere footnote to the same old utility paradigm.

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https://www.cambridgema.gov/CDD/climateandenergy/energyefficiencyandrenewableenergy/switchingtocompetitivesupplyandgreenpowerpurchasing ; Cape Light Compact, MA, not broker-run, offers the only exception: https://www.capelightcompact.org/. Compare this to CCA 2.0 web sites, which "own" the service they offer rather than describing it: Sonoma Clean Power: https://sonomacleanpower.org/ ; Marin Clean Energy: https://www.mcecleanenergy.org ; or Silicon Valley Clean Energy: https://www.svcleanenergy.org are typical examples. In Ohio, same case, from the very large Northeast Ohio Public Energy Council: https://www.nopec.org/ to the very small Southeast Ohio Public Energy Council: https://www.sopec-oh.gov/ .

3. CCAs not using their unprecedented access to data

One of the most glaring failures of CCAs regards their neglect of unprecedented, unique and privileged access to customer utility data. CCA laws and regulations authorize access to data that unlocks the customer base to lower-cost, targeted offers of DER investments, and provides CCAs with the ability to plan energy transitions without increasing energy bills. Yet, the vast majority of CCAs outsource management of their data to brokers or leave it to power retailers, never bothering to analyze this priceless data.

In Massachusetts, the **Cape Light Compact**'s innovative CCA program collects and manage their customers' utility data and use it for targeted efficiency products.

Data is essential for achieving a maximum carbon reduction at the lowest possible cost, based on the annual load duration curve or "8760" hours per year profile of the aggregated community. A failure to analyze this is the decarbonization equivalent to flying blind, because all renewable measures look alike if they cannot be correlated and prioritized according to aggregate peak reduction, capacity requirement reduction, and load reform.

CCA access to data is also *the key to customer engagement*, because it enables analysis of the historic and forecasted utility bill payments of each customer, which enables calculation of the per-customer forecasted return-on-investment from any proposed DER package. Data provides the basis for targeting, integrating and billing DER technologies such as storage, microgrids, and appliance automation. Moreover, data enables CCAs to dramatically reduce marketing and acquisition costs that in some states virtually doubles the cost of installed DERs. Less costly DERs make it compelling for more customers, driving scalability. Finally, CCA frees the program from high-cost outsourcing to focus consulting resources on capacity building and execution. CCA 3.0, using existing member municipality agency staff and service platforms, provides needed municipal leverage and logistical, contractual pathways for DER planning, site- and customer-acquisition costs, in order to minimize costly build-out delays and keep CCA rates competitive throughout the transition to a universal equity offering. In short, data is ground central of CCA 3.0 procurement planning and administration.

Cincinnati has a web-based customer site screening and referral resource for solar installation suitability: a solar power promotion site which allows installers and developers to be connected to customers who have already provided useful information about their homes. This lowers costs for developers and increases solar uptake.

4. Most green CCAs have not integrated customer and public finance

The siloing of CCA programs from procurement is reflected in the manner of municipal DER finance. Many CCA 2.0 programs have secured credit ratings from Moodys,[30] but have limited their investment strategies to agency-owned assets, much like conventional utilities. As one executive said, "all our (CCA agency) investments are our customers' investments." This quote is illustrative of the limits of CCA 2.0 logic, in which actual people (customers) are categorically excluded from ownership benefits. The carbon benefits of "additionality" from real renewables is achieved, but the greater carbon benefits of "subtractionality" utterly missed. Distributional equity is thus reduced to the abstract concept of "The People" (the government), while actual residents and businesses are disengaged into passive consumers of (greener, lower carbon) energy.

Financing customer ownership is a core CCA 3.0 kernel for distributional equity and thus scalability of climate impact, penetrating the whole community's fueling of buildings, cars and heat systems. The vast majority of CCAs have omitted customer financing, limiting their offers to customer incentives. As to customer equity, CCA programs that offer DER products result, therefore, in *inequity*, because only the affluent can afford the investment capital. So once again, disadvantaged populations are paying for the affluent to be greener.

In California, CCA 2.0 has relied upon a Power Purchase Agreement (PPA) approach under which they award 20-30 year contracts to third-party financiers to capitalize, build and own location-specific generation assets, and in some cases, with ownership transfer or "flip" option provisions once the tax avoidance

"Some (California) CCAs are looking at leveraging our tax-exempt status. EV infrastructure or stand alone storage is a potential for bond financing."
-Nick Chaset, CEO, ***East Bay Community Energy***

SOPEC, the **Southeast Ohio Public Energy Council**, worked with their largest member municipality, Athens, OH, to pass a $2 per MW Carbon Tax tax that funds their DER goals -- namely development of new solar arrays on local public facilities. SOPEC is planning a customer billing rate that will fund a small energy efficiency rebate. Customers will be directed to a website portal where they can use their rebate for home energy efficiency measures, including water efficiency. SOPEC also acts as a portal to the state treasury funded Eco-link program.

Nantucket, Massachusetts has passed, via town meeting, a bill adder to finance solar development with a view to including storage in the future.

In **New Jersey**, a CCA consortium of five municipalities led by **Maplewood** have secured approval of a CCA bill adder to directly fund customer energy efficiency measures.

[30] https://m.moodys.com/

benefits have been extracted by the investor. As a rule, however, equity benefits like long-term ownership are not often being planned, energy efficiency programs remain minimal for years, and a general mentality of selling power, rather than saving it, or offering customers a share in the equity, prevails.

Administrative/technological siloing is the main culprit. Even CCAs with active PACE programs among member municipalities have as a rule treated them as “separate” from the CCA program, omitting even (though with some exceptions) to offer PACE financing to their CCA customers, or share resources and materials.

In the end, most CCAs with customer equity components have left customer finance to customers themselves, or their DER installers, who naturally screen their customers for credit profiles. The result, again, is that low- and medium-income customers are *de facto* ineligible for DERs, and all program benefits continue to flow from the disadvantaged majority to the affluent minority.

NOPEC, the **Northeast Public Energy Council**’s, Ohio’s oldest and largest CCA has created STEP (Savings Through Efficiency Program), which provides $5k-$100k 3% loans with a term of up to 10 years for small businesses to adopt measures including PV, Solar Thermal, Geothermal projects and Energy Efficiency. NOPEC also facilitates $100k-$500k fixed rate PACE loans for a wide variety of DER measures for commercial customers.

Nantucket requires that the RECs from a local wind turbine be sold to its CCA customers. The actual electricity is consumed on-site, and offers customers a rebate of up to $500 per KW for customers who adopt PV with a goal of subsidizing 10% of the installation costs.

5. CCAs neglecting municipal, local bank and private partners

At a high level, the single greatest opportunity of CCA control over revenues, rate design and rate setting is the ability to leverage investment, especially now (2020), when financial institutions are *pouring* resources into renewable energy. CCA supplies the missing link for financing by providing access to long-term contracts, which non-CCA municipalities, even those who have other DER programs like PACE or utility-administered energy efficiency and solar programs, simply lack.

Of equal importance, CCA presents an unprecedented opportunity to redevelop underutilized and under-improved public infrastructure as combined community energy development hosts/partners and onsite DER services for the consumer. Electrical and natural gas accounts in public buildings, and EV charger permits on sidewalks, streets and alleyways - otherwise known as public rights of way - are key planning interfaces in many forms of DER, alongside distribution utility interconnect and interfaces. CCAs that get member municipalities to partner for development and power/gas service represent an early stage commercialization platform for DER, based on established site control, scheduled demand patterns, known energy costs, and energy budgets. They merely lack a counterparty to finance onsite DERs. Particularly for the more advanced DERs such as microgrids, municipal buildings and properties are convenient and flexible sites for shared renewable projects. Other public agencies, such as school districts and fire districts and water/sewer districts, open up important critical energy resilience applications, again including microgrids.

California's **Marin Clean Energy** and other CCAs have developed a number of local urban PV arrays. The largest by MCE, ~10MW, was built by local labor on a brownfield site in the City of Richmond, California.

California's **Monterey Bay Community Power** (MBCP) issued an RFP for microgrid development in 2019. Rather than make simple investments in DER installations they are focusing the capture capacity benefits that come with being able to control and dispatch DER resources. Resiliency benefits, the nexus of low-income housing with medical and commercial & industrial facilities represent potential for success across power management, safety, and social equity goals.

The Cape Light Compact in Massachusetts hires local auditors to identify energy efficiency opportunities for individual customers, and local banks in conjunction with municipalities offer 0% Green communities Act financing for approved measures.

Under this arrangement, which represents an initial redevelopment platform for CCAs and member municipalities, participating municipal agencies will receive power, storage, heating and automation upgrades/services, residents/businesses participating in the CCA program may elect to pay a premium to receive shares through a monthly rate- or fee- adjustment. In addition, municipally-owned streets and sidewalks may be utilized as EV charging platforms, and should be considered as core CCA 3.0 resources.

Moreover, municipal ownership and/or control of public rights of way is a critical bargaining chip for utility cooperation. Depending on state laws, franchise agreements with electrical distribution companies offer important municipal leverage in securing the sustained cooperation of distribution utilities providing non-exporting interconnection services to microgrids, and use of metering and data for onsite solar and DERs.

Thus, one of the primary failings of CCAs pursuing 2.0 has been that they have not taken advantage of their unprecedented position to leverage financing, and local investment. Instead, largely because of their siloed approach and neglect of data analytics and modeling, they have ignored or delayed looking at financing, often making all their major PPA decisions before thoroughly investigating financed, non-exporting DER costs. This limits their business case and analytics to a conventional and highly limited NEM payments approach, based on no customer equity participation and conventional third party financing. This, in effect, declares their unconsidered DER model too expensive to justify compared to centralized generation: a self-fulfilling prophecy that drives many CCAs to falsely conclude that centralized renewable generation is “cheaper” than DERs. The devil is indeed in the details, and the failure to use data for targeting and matching of technology to customer usage patterns inevitably leaves all financing to developers and absentee third-party financiers, obviating distributional equity and resulting in in absentee ownership. In turn, by narrowing the value proposition to customers, such programs disengage customers and perpetuate the systematic drain of community wealth.

The Redwood Coast Power Authority (RCEA) is participating in a long-term offshore wind power project. They have issued an RFQ and received a significant response from foreign and domestic firms looking to develop 100-150MW of wind power on floating platforms in the Pacific. The ultimate disposition of the power and questions around transmission capacity remain, but the CCA intends to be an off-taker of power from this project.

East Bay Community Energy in Alameda County, California has set aside money specifically to make grants to local innovators to encourage the development of novel local solutions and firms.

In **Humboldt County**, California, the Redwood Coast Energy Authority is developing its own CCA microgrid, solar + storage, for uninterrupted back-up power on a local airport in conjunction with local medical and Coast Guard facilities.

Specifically, CCA 2.0 programs have failed to seek partnerships with *CCA member municipalities* and *local banks* for DER planning, development, and finance to:

a. Use municipal properties for onsite power use and community solar equity share credits to customers who have no private sector alternative in the neighborhood;

b. Co-plan and co-develop EV charging, microgrids and heat and hot water districts on public properties and rights of way;
c. Engage municipal finance officials among member towns to prepare municipal revenue bonds as a form of financing, or PACE financing, or other local public financing according to local city charters, state and federal law, with or without voter approval, according to state and local law and policy.

6. Very few CCA have renewable heat, hot water and onsite renewable storage programs

Given that many CCAs are formed expressly for the purpose of reducing greenhouse gas emissions, it is perplexing that so few have used their leverage to implement natural gas aggregation for their customers, which provides a similar commercialization pathway to heating efficiency, fuel switching and carbon-free agricultural biogas injection. Ohio and New York CCA laws include opt-out enrollment of natural gas customers, and all states with CCA allow opt-in enrollment.

Cincinnati has a combined CCA electricity and gas aggregation with biofuel offsets -- "100% Carbon Free" heat: a program which allows customers to purchase a biogas product for their gas use. Biogas RECs are purchased from power plants elsewhere in the state and matched to the usage of participating customers.

In many states, and increasingly in those that have recently decommissioned coal power plants, greenhouse gas emissions from the natural gas combustion sector *exceed emissions from the power sector.* Moreover, in some states, building heating and hot water utility bills cost consumers more per month than electricity bills. Whether to reduce greenhouse gas emissions or to save consumers money, CCAs can as much as double or more their climate and equity impactfulness, by taking retail natural gas consumption under management, with a variety of ways to reduce or eliminate the consumption of gas and to lower bills.

Due to shorter paybacks, more efficient, renewable and electric heating/AC and hot water systems present a more compelling return on investment to customers when presented in the context of reducing monthly payments, and also present a strategic alternative to batteries for onsite electrical storage resources.

The Cape Light Compact in Massachusetts is the leader, but not alone in facilitating customer access to state funding for new energy efficiency measures including heat source switching. Auditors are hired to identify energy efficiency opportunities for individual customers, and local banks in conjunction with municipalities offer 0% financing for approved measures, including onsite renewable heating mini splits and solar hot water.

7. CCAs not embracing citizen participation fail to achieve *procedural equity* in governance

Virtually all advanced CCA programs, from **Cambridge** MA to **East Bay Community Energy**, have active citizen participation during formation, launch and operation of their programs.

A key failing of the vast majority of CCA, which, in addition to lack of internal capacity must be considered as *foundational to all other internal barriers*, is a lack of citizen participation in CCA governance, particularly once programs are launched. A failure to engage the citizenry broadly and formally in a participatory process results in actively their citizenries in the CCA governance process can further marginalize already disadvantaged populations such as renters, low-income residents and small businesses. If underrepresented in these public hearings, CCAs receiving primarily affluent/middle class input from small groups of local activists have a tendency to neglect the underrepresented in their program design proposals in distributional inequity in their programs, (such as limiting DERs ownership to homeowners and large businesses). There are many exceptions among the most advanced CCAs, but there is also the rule, which is defined by the back-room-deal-nature of the broker/retail "two middlemen" model of CCA 1.0.

CCA programs with 3.0 components typically have much higher levels of citizen participation during formation. CCA governing board members depend upon sustained, active community participation, at meetings and in voluntary committees, to learn, develop acumen, and embrace change. Achieving active participation is a two-way street, depending on activists, but also upon local officials to inspire them with a compelling idea. Years of experience demonstrate that the failure of CCA programs to expand 2.0 offerings after launch is directly related to diminished public presence at board meetings, particularly once the formation process is complete and activists falsely view their work as being done. CCA 3.0 would change the framing to emphasize DERs and equity. In order to have support, you must lead. As a rule, CCA governing boards cannot embrace significant initiatives without public cognizance and participation. In turn, CCA staff cannot pursue innovative programs without strong direction and support from their governing boards. In an obvious sense, important programs like this demand general cognizance and deliberation.

This is not currently the rule in municipal governance, where most decisions are much smaller, in which public input is often experienced as pressure, and debates around policy decisions a meddling in technical matters. Yet CCA decisions consist of policy decisions, not technical specialization, which is investigated by staff in negotiation with suppliers assisted by consultants as needed. CCA is basically Energy 101 class for the community, with innovation depending on interdisciplinary, not specialized, know-how. Substantive participation by volunteer committees and activists whose leadership and donated technical assistance has produced some of the most advanced CCA programs, is not something to be avoided or diluted, but embraced, depended upon, and ultimately allowed to push the proverbial envelope. It is important to note that the most innovative CCAs have CEOs who are not specialists in electricity or gas procurement, but generalists whose knowledge spans policy, governance, grid energy,

energy technology, sustainability, planning processes, data management/analysis, and politics. Moreover, the successful launches and management of the leading CCA 2.0-type programs resulted from generalists, rather than grid energy specialists,[31] guiding staff, consultant and governing board work, rather than retail or wholesale industry energy specialists, whose knowledge tends toward the conventional approaches to CCA already presented by energy suppliers, and generally have little to no knowledge of the renewables, planning, policy and development processes that must all come into play under CCA 3.0.

A culture of civic participation is highlighted as a significant authority within the goals of a local Green New Deal, where CCA 3.0 is and should be a major community undertaking. It is not a program to implement behind the scenes. CCA 3.0 is energy democracy. Major changes like this cannot be implemented without significant public engagement, both as customers and citizens. Active participation, debate, and front page news should be expected, desired and viewed as essential factors in achieving historic change.

[31] E.g. Maggie Downey Cape Light Compact; Dawn Weisz, Marin Clean Energy; Geof Syphers, Sonoma Clean Power; Eddie Smith, Southeast Ohio Public Energy Council.

E. 3.0 Barriers

While many CCAs feel themselves limited by external barriers, and in some cases are by utilities and state regulatory commissions, t*he profoundest barriers lie not outside but within the policies and capacities of those who manage and govern CCAs*.

1. A failure to integrate "components" is a barrier to scalability

While our national survey has identified over fifty examples of 3.0-type innovations, only California CCA programs are achieving the scale and acceleration of impact that is required by climate change. These programs take years to implement: *but programs that pursue incremental policies, or elect to launch "basic service" first and to implement local programs "later," delay the process for many years if not decades, and run the risk of missing their moment of decision to reduce carbon emissions, having* wasted the political window of formation, when public awareness is greatest, media attention most focused, and elected officials are most motivated to make bold decisions. Once a program has launched, the window slowly closes, and the inertia of bureaucracy makes such bold decisions less likely to occur.

California CCAs have vastly exceeded Massachusetts in renewable development, committing three gigawatts in the past few years. By comparison, Massachusetts CCAs have committed relatively few new renewable resources in the 20 years since 1999. What this demonstrates is that having a program that siloes supply from the development of DER, and in particular an array of many DER technologies rather than none or few, will never meet the speed or scale necessary to impact the ten-year horizon of climate change. Moreover, the difference is not mere arithmetic: it is the exponential difference between half measures and true change, between tokenistic and transformative democratic intentions.

2. The problem of carbon reduction measure sustainability: Renewable Energy Certificates (RECs)

Mark Twain once joked that to stop smoking was the easiest thing he ever did; he said he ought to know, for he had done it a thousand times. Renewable Energy Certificates (RECs) present a similar paradigm for quitting carbon emissions: a temporary gesture rather than an enduring decision.

RECs are a "rental" of Renewable Portfolio Standards (RPS) exceedance that inherently involves a customer's *premium* payment above the cost of uninterrupted purchase of energy from fossil power plants. The ability of CCAs to lower the cost of power below utility and market prices enables some of them to commit savings to this premium, while their ability to retain competitive rates and pay the premium depends on their ability to maintain that cost-of-service margin.

RECs float on the surface of stormy markets. The rental approach to sustainability is itself unsustainable. Whereas committing to added new local renewables and subtracted loads through behind-meter measures insulate CCA customer's cost of

service from the market, buying RECs exposes CCA customers to the market every two years. REC purchases are inherently temporary, because every contract renewal presents a potential policy crisis - a decision between being green and being economically feasible, ever runningthe risk of going green today, but going brown again tomorrow. This tension exists for the following reasons:

a. **Commodity electricity market price volatility** Because CCAs typically procure power for two to three year periods into the future, each contract renewal presents a different market situation; and market prices are volatile. This has led some CCAs (e.g. Chicago and Oak Park, Illinois) launching with high renewable portfolios to drop their RECs at resumption, or else suspend the program entirely.
b. **REC market volatility** The rental model also depends on REC prices, which are volatile.
c. **No transformation, no savings** Whereas investments in fuel-free generation, localization and demand reduction cause downstream reductions in the physical cost of service (based on load duration curve, peaking and capacity requirement reform), RECs create zero impact on the CCA's cost of service, so that being green remains merely a higher cost indefinitely into the future, and is often narrowly targeted to those wealthy enough to pay it as a "green premium."

Many have criticized the dubious, even fraudulent benefits of purchasing out of state RECs due to market distortions. Class I RECs, Solar Renewable Energy Certificates (SRECs) and the SMART incentive in Massachusetts,[32] while an incremental improvement on the *status quo*, do not solve the fundamental problem. While Massachusetts-led NGO, the Green Consumers Alliance, improved on this approach by acting as a purchaser and retirer of Class I RECs that CCAs could purchase in shorter periods to create "additionality" on the local grid (in order to cause upstream economic development), it did not address any of the three issues above. In this sense the REC paradigm itself, which has lesser (unbundled, out-of-state) and greater (bundled, local) impact, presents a too-easy, too-ephemeral alternative to an actual-change-of-business-model. Like renting, it gets you there today, but not necessarily tomorrow. Real, physical investment in long-term in-town assets, in contrast, invests in a new business model that confers measurable carbon reduction, equity, and permanence. Like housing, climate solutions are better to own than to rent.

In California, **East Bay Community Energy**'s Demand Response pilot has graduated into a full-scale program. its ultimate goal is to use DER+storage to reform their peak load sufficiently to remove the need for peaking capacity from gas fired plants.

3. The problem of carbon penetration: DER export tariffs

[32] See Appendix B: Glossary.

The performance of conventional U.S. DER incentives, while locking in much longer-term carbon impacts from installed systems, has proven incapable of impactfulness beyond a tiny affluent minority of energy users. The tendency of CCAs to imitate conventional utility tariffs, or slightly improve the terms of such tariffs, has had uniformly disappointing results. Net Energy Metering (NEMs), V(Virtual)NEM and Feed in Tariffs (FITs), have failed to achieve the kinds of scale or speed of customer engagement to present a serious commercialization pathway to decarbonization for a variety of reasons:

"Solar NEM customers impose an impact on the grid. The ramping and variability of the generation leaves the utility needing to procure resources to match the usage profile of solar photovoltaics. You can do it with dispatchable resources like hydro or peakers. But the holistic way would be buying storage to offset the Resource Adequacy cost of their PV. We have discussed the possibility of mandating those shares: one way could apply for their money back in the form of a low-interest loan to install storage onsite. Otherwise, they could buy shares in a utility-scale PV plant." —Chris Sentieri, Consultant, **East Bay Community Energy**

a. **Inherently limited by utility interconnect caps and permit delays** Net Energy Metering and related tariffs are by definition *export* tariffs; therefore, DER site selection is marketing-based rather than targeted to fit daily usage patterns, such that the customers' actual onsite use of installed DER capacity is not actually being used under normal conditions. Such DER amounts to very expensive grid capacity for which state regulations have required utilities to provide compensation. This is a kind of welfare program for building owners. Because distribution grids have limited capacity to absorb such power without voltage regulation measures (for which all customers, most of them low-income, must pay), severe restrictions are applied to export-based interconnect permits, forming a systemic barrier to decarbonization.

Valley Clean Energy, in Yolo County, California, is considering a strategy of developing storage to bring down the cost of resource adequacy. NEM customers could buy shares in the storage development to virtually participate in balancing the impacts of their solar PV arrays.

b. **Very weak engagement of customers** CCA programs with NEM, VNM and FIT programs uniformly show weak results in engaging customers, who are left to the same market participants to choose as non-CCA customers, including the same lack of data about their energy use and bill forecasts, the same lack of credit support, and the same lack of vetting of contractors and consumer protections, in an industry that is rife with fraudulent marketing practices. As a result, CCA-based NEM, VNM and FIT programs have had extremely low customer participation levels and uniformly little impact.

4. DER industry problems: gaps between supply and demand

Several barriers to 3.0 lie within the condition of the DER industry itself, many of which CCAs fail to circumvent through available commercialization pathways:

Montclair, New Jersey used dedicated state funds to design a microgrid with a third-party consultant to serve critical loads with electricity and heat anchored to a local hospital and reaching out to emergency services and critical loads on adjacent sites.

a. **Utility dominates the customer's relationship to energy services** The most powerful barrier to DER is "intellectual customer captivity" by, and communication within, the utility business model. Customers' current understanding of options comes from their electricity and heating fuels bills, and separately from a DER provider's marketing such as door-to-door sales, and flyers, which primarily advertise homeowner appliance products, whose economic value proposition does not translate. Municipalities that provide a utility-like CCA service defined by rates and green content while (in some cases) separately offering DER ownership products through separately administered programs, fail to penetrate the utility's dominant customer relationship/paradigm, and suffer disappointing customer subscription levels in their DER offerings.
b. **Energy industry credibility** CCAs that outsource their customer-facing programs suffer diminished public trust levels due to widespread mistrust and choice fatigue with energy marketers. Thus, in addition to being unable to evaluate the value proposition of DER products, consumers do not trust commercial pitches. CCA programs that outsource customer facing programs such as customer service and web communications themselves erect a significant trust barrier to DER deployment.
a. **Credit barriers** Credit access limits low- and fixed-income residents from qualifying for developer-financed DER products that confer equity to customers.
b. **Need for large counter-parties/off-takers to secure funding** Large integrated DERs (iDERs) depend upon creditworthy parties and off-takers (to commit to purchase power or capacity) to attract investment. To the extent that developers depend upon such parties, accessible customers are limited to the most affluent consumers.
c. **DER site/customer acquisition cost** The cost of finding willing and affluent customers whose energy rate and usage are sufficiently high for a compelling DER return on investment, is a major barrier to DER deployment, with inequitable results.
d. **Under-articulated DER permitting guidelines** Apart from marketing costs, interconnect and municipal permit delays cause costly waiting periods and can

Municipalities like Cape Cod, Martha's Vineyard and Nantucket have a strong need for the resiliency benefits that virtual power plants provide. The CLC and Nantucket are in various stages of planning and developing the roll-out of storage and control DER to meet their needs, including the potential financial upside of reduced grid demand and capacity benefits.

also compromise the subsidy and tax refund windows offered by state and federal governments.

e. **No access to customer data** Lack of data is the core cause of sky high marketing costs, because it necessitates a backward process of marketing, followed by energy audits to determine economic viability. CCA availability data would reverse this process and enable low-cost, tailored, targeted customer offerings prior to audit and credit check.
f. **Unprepared municipal DER development process at launch** Another barrier for DER rollouts is the failure of CCAs to partner with municipalities for development of their buildings, creating unnecessary stall at program launch when private sector site acquisition processes get started.

5. Community shares

Community shares are a key missing link to overcoming many of the barriers to a DER-centric 3.0 program, and to provide for distributional equity. However, conventional shares program practices can also present a new kind of barrier, and deserve special attention.

In California, East Bay Community Energy are exploring not one but four configurations or approaches to community solar development as a part of their robust planning investigation. Which design will prove most effective remains to be seen.

At a high level, a deep penetration of community shares installations is an uniquely aligned opportunity for CCAs compared with supply utilities, because of CCAs' unique lack of revenue conflicts from scaled reductions in both the level of transmission *and* generation demand that shared renewables can provide:

a. Community renewable shares can overcome many CCA barriers by allowing people in a neighborhood to "virtually" own the ownership- or future bill-offset benefits of any kind of DER at any location within a CCA's service territory.
b. Thus renters, people with no credit, anyone who pays an electric (or gas) bill, are eligible to elect voluntarily to pay a premium rate and receive an annual accumulation of bill offsets. Security on nonpayment, being virtual, requires no repossession or legal action, but is achievable by the retention or revocation of virtual benefits. This is the key to its inclusivity as an equity platform: all customers, however low their income or level of wealth, present acceptable risk.
c. Credits could be cashed out based on a formula of lifecycle value when customers so decide or otherwise leave a CCA's service territory.

New York State's first CCA, Westchester Power, has a local community landfill sited PV generation project with hundreds of customer subscribers aiding with the project financing, along with support from the New York Green Bank, to improve the financing conditions for that project. Enrollment in that program began in 2019.

That being said, there is a wide variety of “shared renewables” programs out there, and it is critical that CCAs take the opportunity to present a program that both confers authentic equity benefits and takes advantage of the rate design, ratesetting authority and other CCA resources identified in this report, such as billing, communications and trust. Inauthentic shares programs can themselves constitute a barrier to participation. Typically, shares programs offer investment equity for those that can pay upfront or **“**subscription” green pricing schemes for those who cannot. Under this approach, “shares” offer ongoing bill offsets, but no accumulation of actual equity for the consumer.

Trust has two levels: basic recognition and active sympathy. Municipal, local governments are known as participatory organizations based on an open process, subject to meeting laws and accountable elected officials. From water and sewer to waste management and other critical public services, municipal agencies are trusted by state and federal governments. Whether municipalities are beloved to their residents and businesses is less important than that they are fundamentally distinguishable as institutions from private businesses. By comparison to public transparency, private institutions can be opaque if not secretive, unaccountable if not fraudulent.
As recognition and transparency are essential to building the trust that is a precondition for broad customer engagement of all the members of the community, apart from municipal loan administration, the other key program elements to create and reinforce trust are *insourced* customer-facing operations, principally:

- An in-house customer service desk;
- In-house data and account management; and
- Public websites.

Community Choice Aggregation 3.0 involves a CCA agency and a member municipality cooperating on municipal facilities retro-commissioning, customer loan account management, and local planning. As the CCA itself is often unknown to residents and businesses, it is less recognized and trusted than their town or city government. A key engagement strategy within 3.0 is centering engagement in this trusted and underutilized resource.

If properly designed upon an authentic local municipal loan administration platform, CCAs are uniquely positioned to calculate, forecast, enroll, and compensate customers in shares in a simple, credible, transparent manner. Any and all CCA member municipalities and customers should be eligible, through (1) shares and (2) cooperative products and applications, to enable local distributional equity, investing directly in a systematic shrinking of grid energy and capacity, resulting in the most impactful carbon reduction strategy that exists. The programs’ directives are:

- To ensure trust of customers, the CCA will administer the shares program in-house, not out-source to a commercial shares company;
- To ensure equity, the program will be a universal, standard offering to all consumers, to ensure equity;
- To enhance neighborhood equity, a *neighborhood shares* program is advised, which subscribes customers in an engaging, visible, truly local DER installation.

6. State government-caused barriers and recommended regulatory/legislative actions

The following is a description of the need to overcome barriers by changing state policies, using association, regulation and/or legislation.

a. All CCA states: need for statewide CCA associations

CCAs are poorly represented at state regulatory commissions and legislatures, due to an individualistic and piecemeal approach that depends too much on a few CCAs or municipalities that must carry the whole weight of advocacy. CCAs that individually lack the budget to pay for legal, regulatory and technical discussions are under-represented before regulators, considering the number of customers they serve, and despite being both public agencies and widely recognized for consumer benefits and renewable energy innovation compared to retail suppliers or utilities.

The first recommendation is that CCAs organize or join a statewide NGO to represent them at state legislative proceedings. As state energy policy is a moving target, staying abreast is important for safeguarding CCA interests, aligning efforts with approved programs, accessing resources, and winning utility cooperation. Moreover, there is always a need for lobbying to defend and improve CCA rights.

The process of regulatory involvement is more complex, requiring staff and activists to familiarize themselves with the specific rules and nomenclature used by their state utility regulatory body, so that they can effectively participate in dockets and proceedings. Cooperation between CCAs, municipalities and active citizens can pool resources and prevent duplication and/or confusion in the pursuit of common goals. Municipalities and CCAs that have more, or more developed resources and capacity should lead and assist those at an earlier stage of development or activity. A central repository of regulatory knowledge also informs member CCAs of each other's innovations, comparing notes, and friendly competitions to create the best new strategies.

Finally, almost all of the documentation, from local ordinances to form CCAs, mandate goals, and authorize financing mechanisms, as well as filings at the state regulatory level detailing CCA plans, energy efficiency and DER-related proceedings, tracking hearing dates, and more, are publicly available and very frequently accessible online. The information needed for CCA 3.0 focused groups to ground themselves in this engagement are readily and openly available.

b. States without CCA laws

States without CCA laws have only utility municipalization as an optimal path to climate equity. While many states have aligned pathways such as PACE financing, they lack the essential "middleware" that integrates the program under an empowered municipal umbrella. Traditionally, this kind of local public control was achieved through an eminent domain process involving a taking of utility distribution systems, such as is being attempted currently by the City of Boulder's "Boulder Energy Future" program,

which after nearly ten years and voter approval has not yet accomplished acquisition of its utility company's assets.

Thus, states and municipalities that wish to pursue climate equity should adopt legislation to allow CCA. Specifically, this has been accomplished by the adoption of resolutions by municipalities, lobbying of legislatures, and the grassroots support of citizens, from climate justice to climate protection, energy independence, consumer protection, DER industry, renewables industry, and proponents of competition in the electricity and gas industries. By forming coalitions around official municipal support, CCA advocates have proven able to win approvals from local legislative delegations of those municipalities, their members in leadership positions, and ultimately the voting majority. Advocates should expect a two-year effort to adopt CCA laws. Drafting of CCA legislation should not be copied from existing states, but be adapted to state laws, protocols and nomenclature.
The following is a full list of barriers as well as suggestions to overcome barriers in CCA states. The list is generally broken down by state, but is presented as a fully enumerated list because a number of the items are applicable multi-state.

c. California

i. **Participation in California Public Utility (CPUC) proceedings and the legislature** must be sought to clarify regulatory nonalignment and/or interference, and limit negative impacts from utility programs and rules. In the most recent session of the California legislature no less than six bills that may potentially harm CCAs have been introduced. In many ways, CCA has grown to incredible prominence with support of the legislature against the opposition of regulators. In recent years, the CPUC, still widely criticized for undue utility influence during multiple governors' tenures, has approved large CCA exit fees twice (Power Cost Indifference Adjustment or PCIA), and approved a multi-billion dollar reallocation of utility generation costs to transmission, shifting costs onto CCA customers. In California there are both numerous CCA activist groups as well as a statewide organization representing the state's CCAs. CalCCA[33] takes

California has a complex and shifting energy efficiency funding environment. Similar to Massachusetts, CCAs have statutory authority to administer large amounts of energy efficiency funds collected from their customers, but utilities have persuaded regulators to interfere with this authority. The **Marin Energy Authority** has had a plan approved by the **California Public Utilities Commission** (CPUC) to administer $6-9m annually in these funds to finance their own EE programs for their customers. Other CCAs, avoiding the planning process involved in a larger program, having claimed smaller amounts.

[33] http://Cal-CCA.org

the central coordinating role in opposing adverse regulation and legislation. Costs of staffing and operations are covered by modest contributions from CCAs and municipalities, and membership is opened up to the private sector to increase contributions. Activities of the association include regular emails informing interested individuals and groups of the relevant hearing times for each bill as they pass through committee, contact information for the legislators involved so that they can be directly contacted by their constituents, and information and talking points for those constituents to use in their activities.

ii. **Integration of renewable energy with energy efficiency/storage technologies disallowed within Public Goods Charge (PGC) funded programs by the CPUC - while simultaneously targeting CCAs for overloading the grid with renewable energy** By focusing on exporting Renewable Energy installations, i.e. in-front-of-the-meter such as field photovoltaics (PV) on brown and greenfield sites with a scale of 10-100MW, California CCAs have invited criticism from state regulators and IOUs of the grid impacts of these arrays. However, the present energy efficiency funding regimes in California preclude integration with energy efficiency and storage, which would provide capacity and grid reliability benefits. Establishing a DER and behind-the-meter incentive regimes would stimulate deeper market penetration for renewables and efficiency, while directly enhancing grid stability.

iii. **Cost effectiveness Total Resource Cost (TRC) criteria for Energy Efficiency Funds prevents complex/more expensive measures from being funded** Total Resource Cost is one of the group of tests that California regulators use to prioritize funding for energy efficiency measures. The most cost effective measures, like lighting retrofits, are well funded, but several problems emerge from this calculus. Alternatively, in a bundled DER approach, low cost measures subsidize higher cost measures - blending paybacks technologies and retrofits - which increase carbon reductions and potential equity benefits. It is the cost effectiveness of a combined integrated asset, not the cost-effectiveness of any one component of the asset that matters to customers. CPUC's criteria are blind to the distinction. Staff state that, "the low-hanging fruit is picked," and complex measures as compared to lighting, are presented as uneconomic. As noted above, energy efficiency cannot under current rules be funded in conjunction with renewable energy.

iv. **Investor Owned Utilities (IOUs) allowed to circumscribe the use of energy efficiency funds by CCAs (non-duplication of programs)** While CCAs have broad statutory access to energy efficiency program funds collected from their customers' bills, in practice, regulators have allowed IOUs to prevent local control of funding over measures and programs that the IOU already has in place.

v. **Increasing legislative attacks on CCA autonomy in Resource Adequacy (RA) procurement and rate-setting** There have been numerous attempts in the California legislature to curtail or eliminate the sovereignty of CCAs. The 2019 session is no exception, with attempts to take away rate-setting and resource adequacy procurement from CCAs

and place them under the control of the CPUC. CCA administrators have formed a statewide entity to lobby the legislature to maintain their autonomy, in addition to their own local engagement with lawmakers.

c. Massachusetts

i. **There is a strong need for cooperation between municipalities in engagement with the legislature and regulators** with particular focus on Department of Public Utilities (DPU) nonalignment/interference with CCAs.

> "It took the (**Massachusetts) Department of Public Utilities** (DPU) six months to certify our second plan. It should have a taken a month. If the DPU scrutinized the retailers like they did CCAs it would be a huge help. DPU is focused on suppliers, being run is a long-term industry insider. The agency is not interested in community leaders trying to explain CCA's benefits."
> *-MA CCA Administrator*

ii. **CCAs should engage Mass CEC together.** There is a need for engagement/advocacy to expand the Mass Clean Energy Center (MassCEC) funding scale limited for multi-site IDER, such as its microgrid program, which is limited by high one-off engineering costs. MassCEC offers nearly $30 million dollars in annual awards and grants in the energy sector. Awards can be specifically for renewable energy on municipal sites, especially where they can assist small vendors find an early adopter for innovative technologies. For rebate programs, the installers of eligible technologies apply for the rebates on behalf of the municipality. Amounts vary by program. For solar hot water, for example, rebates may be up to $100,000. There are guidelines that the MassCEC posts to its website to inform entities hoping to take advantage of its programs on the ideal preparation for a project to receive support.

iii. **CCAs should combine efforts to apply to administer energy efficiency funds** Coordinated advocacy and coordinated application preparation are recommended to navigate DPU resistance to CCA administration of Public Goods Charge funds, as the recent application of Lowell for "Part B" funds were met with no response. Several CCA staff interviewees express the impression that the DPU appears to be discouraging CCA applicants in spite of state law.

> "(Massachusetts) **Department of Public Utilities** is not all that helpful, even antagonistic to these (CCA) programs. I think the leadership has no idea what CCA is or does. DPU throws CCA under the bus at every opportunity. The smart meter docket went nowhere because they even claimed the cost recovery could not be spread across ratepayers because there are so many CCAs."
> *- MA CCA Administrator*

iv. **CCAs should combine efforts to better define protocols for CCA data**

access Many of the CCA staff interviewed were unaware that monthly kWh data is available and useful for program development. Remedies should be sought further for lack of bill access and data access.

v. **Mil adders for energy efficiency funding not yet authorized by the DPU** Attempts to use a bill adder to finance local energy efficiency have not been authorized by the DPU. Communities who want to go beyond the scope of statewide energy efficiency funding have been frustrated in their attempts to access efficiency funds to which they are legally entitled, and obstructed from directly collecting funds to this purpose.[34]

vi. **The interests of CCAs are inadequately represented at the DPU and the legislature** Unlike California CCAs which have developed state-level lobbying organizations and capacity, Massachusetts CCAs do not have a comparable organization. CCAs would benefit from coordination and sharing resources to protect their rights at the legislature, as well as developing and advocating for progressive changes to existing law.

vii. **Storage and local resilience DER programs blocked by IOUs on "grid stability" grounds** Our study encountered instances where DER implementation, in this case the deployment of hundreds of battery storage systems to CCA customers, has been disallowed by the IOU and regulators over concerns for the reliability of the IOU's distribution system.

viii. **Data access and use are under-developed** Customer usage data is handled by IOUs, brokers and suppliers, but while the data is available to them as CCAs, and the Cape Light Compact has long accessed and used it, there has been a reticence by some CCAs interviewed to take possession of their customers usage data, leaving this to their retail supplier and/or broker. This omission severely limits a CCA's ability to identify, engage and develop local resources. Even monthly kWh data is immensely valuable for forecasting return on investment on DER products for customers, to identify and enroll facilities for load reform and DER integration, and to tailor products that match each customer's known energy use demand levels with DER technologies suited to their daily and seasonal schedule of energy demand. Finally, without such databases, CCAs lack the necessary infrastructure to actually offer customers products. Otherwise, CCA programs uniformly pursue low-impact, pilot-type programs unlikely to have a significant climate impact. As a matter of due diligence, a data-rich form of design and planning is employed to a cost-effective local DER development plan. CCAs in California take possession of their data as a key strategic resource and focus on using it for portfolio planning and plans to transition to a majority local DER power supply. There have been suggestions in Massachusetts, contra the precedent set in California, that it would be inappropriate for a public entity to possess the data, yet it is

[34] DPU has not ruled either way on the adders, but an interview indicated some form of resistance. Project survey interview with Mark Cappadona, Colonial Power Group, the state's largest CCA broker, Massachusetts, 2019. Mr. Cappadona was unresponsive to a follow-up call requesting the details of the referenced exchange. For information about Colonial Power, see http://colonialpowergroup.com.

uncontroversial that it is presently handled by private corporations. Several interviewed Massachusetts CCA directors expressed concerns about CCA data access being potentially subject to public disclosure requirements under the state's freedom of information laws to compel a municipality to disclose customer data. This is unprecedented in the history of Community Choice Aggregation in the United States currently, and is contrary to broadly practiced standards of a wide array of municipal services.

d. New York

ix. **NY CCAs await Public Service Commission (PSC) decision on consolidated billing** With New York's Community Distributed Generation, many CCAs are waiting for the PSC[35] to put in place, and allow CCAs to use, a system of consolidated billing to support opt-out distributed generation. While possible to implement without this change under existing regulation, it will have to be explored via CCA efforts and Public Service Commission (PSC) engagement.

x. **Managing transactions between community shares in DER and the CCA** Sustainable Westchester has launched enrollment in its shares program for a PV installation on a local landfill, but they have been unable to fully integrate what is called Community Distributed Generation in New York with their CCA power supply. Whether CCAs will have to register as Energy Service Company (ESCOs) or find another solution is not clear.

xi. **Poor access to the bill** Related to the problem above, having control over customer billing is key to financing wide-scale DER. There is concern that tax districts will have to be created as a work-around for this problem. There is difficulty in enrolling Direct Access (DA) customers, including large Commercial and Industrial (C&I) and institutional customers (universities), which often contract for power supply with ESCOs, who are independent third-parties. Sustainable Westchester would like to enroll DA customers on an opt-in basis, but even on those terms there is a question of whether such agreements would have to be vetted by third parties under restrictive PSC rules, which are not appropriate for CCAs.

xii. **No Public Goods Charge** CCAs in New York may not presently assess a fee to customers to finance DER in that conventional arrangement. Attempts to apply for one have been rejected by regulators, but future applications may meet with different results.

e. Ohio

xiii. **Ohio faces limited state funds for DER and a difficult environment for community shares** Challenges to DER-funding and creating community shares, combined with a lack of bill access and data access are all issues to be pursued, by groups of DER focused CCAs at the Public Utilities Commission of Ohio (PUCO) and possibly the legislature.

xiv. **Virtual Shares are difficult to implement as production credits cannot be allocated to off-site meters/customers** Attempts to create solar shares programs have been hindered by Ohio's rules, which

[35] New York State Public Service Commission Case 19-M-0463, In the Matter of Consolidated Billing for Distributed Energy Resources.

disallow transfer production credits generated by a solar array at one site, to the accounts of customers who would have a shares investment in that local PV installation. Allocation strategies have to be employed to work around existing utility constraints.

xv. **Bill access is limited** Unlike California and New York, where CCAs have broad theoretical access to the customer bill, Ohio IOUs deny CCAs the ability to add items aside from simple usage amounts and pricing. The ability, for instance, to add a bill insert to CCA customers for the purposes of DER offerings, is an important marketing channel that is not open to CCAs at present. There is added confusion because two separate entities assess distribution and generation charges, leading some customers to believe that they are being double-billed.

xvi. **Rogue suppliers are causing fear of alternatives to utility supply through deceptive practices and pricing** This issue has come up in multiple states. Competitive suppliers who attract customers with low rates that are then increased dramatically without customer awareness is just one example of how these entities poison the well for CCAs. Local government-facing CCA programs, rather than third party-facing programs, are thus advisable to establish trust for effective public engagement.

f. New Jersey

xvii. **Developing renewable energy projects in order to sell power to CCA customers is an unresolved question** This question, considered at New Jersey's Board of Public Utilities (BPU), will require negotiation with regulators. Microgrid studies view financing as an open question, underscoring the need for clarification and supporting decisions. Lobbying for increased state support for local resiliency efforts, such as islanding microgrids, is appropriate.

xviii. **There is a shifting landscape for state-directed energy efficiency funding** Recent changes in state law mandate increased efficiency for IOUs, but the path to implementation is uncertain. CCAs have claimed success in increasing their bill adder to create an energy efficiency fund, in addition to what is collected to pay brokers.

xix. **Uncertainty about allowing CCAs to sell electricity from DER directly to customers** New Jersey CCAs have tested this important question with the state regulators, the ability to develop and then directly sell the power from DER developments, and thereby remove middlemen and administrative complexity, while directly offsetting CCA customer loads. While regulators have not rejected these ideas, the question of how a CCA would take on this role has been left open. It is possible that they will have to register as an electricity supplier in New Jersey to pursue this goal.

g. Illinois

xx. **After an extraordinary expansion of Illinois CCAs circa 2012, a number programs have been discontinued due to fluctuating rates, which led to savings that decreased or disappeared** Vulnerable to power contracts with no DER or other program components, the (broker-based) CCA 1.0 model adopted by these CCAs, resulted in over-exposure to market fluctuations; their overly-narrow rate discount-based

service definition and value proposition to consumers intensified this exposure by establishing no other reason to participate when discounts were interrupted. In the case of Chicago's program, termination of its CCA was virtually planned, having been formed strictly based upon the opportunity to reduce consumers' rates for two years in anticipation of the utility's terminating high cost contracts. Similarly 100% green REC-based programs could not afford to meet that goal and provide savings. The Metropolitan Mayors Caucus reports broad interest in DER from member municipalities, but that those towns often lack the staff resources to match their desire for climate, energy efficiency savings, and resiliency benefits. A lack of resources to match real interest and demand is a persistent problem repeated in Illinois.

xxi. **The state government has been to varying degrees in financial crisis, such that while funding for programs may be provided ultimately, uncertainty undermines activities** Local governments lack staff resources to pursue DER goals that they would like to realize and/or expand.

xxii. **Poor program design for solar initiatives at the state level led to poor results in deployment of PV** A recent push for small (<2MW) residential focused installations failed to find subscribers and shifted to green field development instead. Uncertainty in state-level procurement for new renewable energy has also frustrated the bidder pool of developers.

xxiii. **Opaque interconnection rules frustrate and discourage renewable energy developers** A subset of the challenge of the development environment is the difficulty and confusion around interconnection agreements between third-parties, utilities and regulators.

xxiv. **IOUs subsidize many municipal accounts precluding traditional payback economics for DER** In Illinois, it is customary for utilities to provide power to municipal accounts for free. This means there is no financial gain to offset load on municipal accounts with DER. This arrangement often does not include fire-districts, so municipal DER development can utilize those accounts with attractive paybacks.

7. Energy efficiency surcharge funds administration by state

a. Massachusetts

The Massachusetts Department of Public Utilities appears unresponsive towards CCA efforts to administer funds according to state law, and has prohibited funding of 3.0 type programs. One main problem is that so few CCAs have attempted to administer the funds, and, secondly, they have not used Cape Light Compact's resources as the leader in this arena.

Massachusetts DPU policy increasingly blocks integrated resource planning and slows development of advanced energy efficiency measures, that could otherwise provide not only less consumption by consumers, but also peak aggregate demand reduction and

local resiliency. As CCAs could become the majority procurement entities in the state, it is critical to address this challenge.

i. Cape Light Compact (CLC)

The Cape Light Compact (CLC), the nation's original CCA, also serves as a Program Administrator of Part B energy efficiency funds for both its customers and statewide programs, as provided by the state's original municipal aggregation law. There are eight IOUs and one CCA serving this function, making a total of nine Program Administrators in Massachusetts.

CLC is presently working under the 2019-2021 plan, which is focused on three sectors: Residential, Low-income, Commercial & Industrial customers. The planning for 2022-2024 was scheduled to begin in late 2019 begins later this year. On the third Wednesday of every month the planners meet in Boston.

The DPU also requires that the CLC do evaluations and cost-effectiveness studies if they want to do innovative programs outside what the IOUs are doing, which is costly and time consuming.

The Cape Light Compact participates in the three year plans that are a part of the state level process for determining the use of energy efficiency funds collected from ratepayers.

As a result, CLC's energy efficiency budget dramatically increased from $5m to $40m annually. To administer $40M per year in funds, CLC's legal counsel, which submits plans, intervenes and participates in dockets at the DPU, costs hundreds of thousands of dollars per year.[36]

The legal and regulatory process to access the funds has become more constraining over time. Originally, the CLC simply needed an approved plan. Now the regulations mandate development of a three-year statewide plan, required by the Green Communities Act, for a CCA to collaborate with regulators.

ii. Lowell

The City of Lowell has a history of working successfully with energy efficiency firms. As they have a unique population with specific energy efficiency needs, they have a strong interest in having control of their potential Part B funds. Their approach was to authorize a third-party to help pursue those funds at the DPU. After filing an application to become a Program Administrator in October of 2018, this application has not, at time of writing, received neither a docket number from the DPU, nor a hearing.

[36]This figure varies by season based on the state's schedule of related activities.

b. California

The California Public Utilities Commission (CPUC) is blocking funding for CCA applications to administer integrated energy efficiency measures with onsite distributed renewable generation, and is shifting program funding over to utility-administered outsourcing based upon state-defined locational values. This has resulted in only two of nineteen CCAs seeking to administer programs, and only one now doing it.

As CCAs, not utilities, are now procuring most of the power in California, the new rules currently block integrated resource planning to make possible grid enhancing development: the very lack of which is the CPUC's main justification for interfering with CCA control of their procurement in California's 2019 legislative session (AB56).

i. Marin Clean Energy

Marin Clean Energy (MCE) was slow to adopt a demand-centric approach in the years following its launch in 2009, even though energy efficiency is by far the lowest-cost carbon-reducing resource for consumers. Despite the fact that MCE was chartered as a decarbonization agency, and energy efficiency represents a pure upside for CCAs, which, unlike grid supply, lacks transmission and fossil plant dependency, MCE's early decision to pursue a REC-based approach with supplier Shell North America might have proved disastrous had it not been formed, and continued to be pressured by, local activists who understood the danger of California's first CCA taking the conventional utility approach to procurement. Marin's initial "take or pay" contracting structure set in place multi-year incentives against reducing energy use, which would have required the CCA has to take the electricity, and pay their suppliers for volume of contracted electricity. MCE set in place a major lesson learned about the importance of launching a program with a clear localization, demand reduction strategy, not "later."

However, in recent years, due to the persistent and consistent pressure from local citizen participation at its monthly governing board meetings, MCE has expanded its focus on energy efficiency including an application to the CPUC to administer $6-9m a year of funds collected from their rate-payers to be used for programs that they have designed. MCE has focused on multiple family residential energy efficiency in the past, but is now turning to industrial and agricultural energy efficiency opportunities. As of 2020, MCE also have a large energy efficiency outreach staff.

ii. Sonoma Clean Power

Sonoma Clean Power (SCP) followed Marin and did not face the same hurdles. They have a variety of demand-focused programs including IP thermostats and appliances for homes so that they can track consumption data and improve their offerings in energy efficiency. But their reason for not pursuing funds at the CPUC reveals a paradigmatic problem in both California and Massachusetts, where obsolete regulatory requirements ill adapted to CCAs essentially block the use of the energy efficiency funds for efficiency-integrated DERs. SCP objected to the CPUC's Total Resource Cost (TRC) test, because this test focuses money on programs that have been proven to be "cost effective," which

SCP leadership pointed out is already covered by the utility/private sector. SCP asserts the test criteria should be the opposite: Public Goods Charge (PGC) funds should only be spent on measures that might be cost-effective in the future, but need investment today by the CCAs that are integrating them with lower cost measures. SCP says the existing CPUC test prevents innovation: "we need to find lines of investment which will create markets in 5-7 years time instead."

8. CCA 1.0's "two middlemen" model

A key barrier to DER development by CCAs is over-dependence on brokers and power retailers. The appeal is that brokers do the upfront program implementation work without requiring payment in advance, based on the promise of an increment on power sales once the program launches.

> "The use of the mil adder should be used to hire staff and develop their programs internally rather than using brokers. Brokers are doing all the work and towns want something for nothing. Towns forget their programs when they use brokers."
> *- MA CCA Administrator*

Outside of California and Cape Light Compact in Massachusetts, many CCAs have adopted a broker-centric business model, under which all of the essential functions of the service are performed by outsourced contractors:

a. CCA staff, who are often non-existent, and otherwise are limited to one to three staff;
b. A broker, who is responsible for preparing required CCA documentation - in particular an implementation plan - and presents the CCA's desired products and terms to retailers, who invite supplier bids to bring back to the CCA for approval, and in some cases acts as a repository of utility data;
c. A retail supplier, who undertakes the functions required for the procurement, transmission, and billing of customers;
d. Wholesalers, who generate power.

The CCA 1.0 model limits the CCA administrator's role to that of a client, hiring a broker to negotiate with retailers, who provide the necessary credit, control data and utility and ISO relationships and buy from wholesalers.

By way of contrast, California's CCA 2.0 model is focused on physically local and regional development of renewables. The "direct wholesale" was part of the CCA 2.0 leap in that broke up the functions of the two middlemen, giving CCA managers control, knowledge, and data, as well as the staffing capacity to directly implement local renewables and energy efficiency programs.

The core problem is, of course, the zero-sum game of program funding. Because the "simple" CCA forfeits the marginal adder revenues needed to staff 3.0 to the broker, it both defunds the CCA administrator and deprives the CCA of the ability to participate in and guide the CCA's procurement strategy to be focused on DERs.

A recent Local Power-led University of Massachusetts study of green CCAs in the state, concluded that the use of brokers is a major barrier to the pursuit of "advanced CCA."[37] Broker-run programs are dependent upon their brokers not only for managing the relationship with retail suppliers, but also for their understanding about energy markets, what goals are achievable (reducing sales), what resources are available (energy efficiency funding) and their possible options under CCA. Whether brokers actively deprive CCAs of the opportunity to learn about or pursue DER options, or are simply unqualified to advise them outside the narrow envelope of a service definition that benefits them financially (their source and amount of pay is based on the volume of power purchased from the retail supplier), use of brokers is associated with conventional, supply-side, non-innovative CCA programs, and a tendency of programs, once formed, to stop learning and developing. As a result, the professor guiding our UMASS survey of Massachusetts CCA governing boards found that CCAs with brokers have little knowledge about the programs. There was one particular instance reported from an interview in which a town administrator, who is responsible to be the official signatory of CCA implementation plans sent to the Massachusetts Department of Public Utilities for approval, did not know her town is, in fact, a CCA. In such towns, members of the public, as a result, know or understand even less.

Because of the linkage between brokers and lack of CCA program funding to hire DER staff, the problem described above is among the greatest barriers to CCA 3.0. What brokers are unprepared to do, their allocation of administrative funding obviates the funding of CCA staff to start doing it. Thus, giving brokers the whole administrative adder fee is simply inconsistent with CCA 3.0; another arrangement is needed, specifically re-insourcing of the broker's role to negotiate directly with suppliers.[38]

[37] This study has not been released for publication as of this data. For a copy, contact Local Power at paulfenn@localpower.com.

[38] It is no coincidence that Cape Light Compact, Massachusetts' only robust CCA in terms of DER focus and success, is the only program in the Commonwealth that is not broker-run.

F. Economic Analysis

1. Paradigm shift from 1.0 to 3.0

Apart from a shift from central generation to distributed technologies and supply to demand, the evolution or paradigm shift from 1.0 to 3.0 involves a shift in **optics.** One optic shift is in the definition of program benefits, from narrow to broad. Another shift is in the criteria of pricing, from rates to bills. There is the optic shift of risk, from market risk to logistical and operational risk. Finally, an optic shift is required in the customer relationship, from simply not opting out, to actively stepping in to participation and investment.

Whereas supply-side conventional CCAs focus on rates and supply risk, DERs produce bill savings from accelerated demand reductions and load reform.

CCA 3.0 is a transition from a narrowly defined program designed to serve existing electrical accounts or "plug loads" to capture a much greater envelope of carbon emissions in a community. Whereas a "simple" CCA 1.0 can hope to impact only about one quarter of greenhouse gas emissions, a "complex" 3.0 program can impact over three quarters of all emissions.

The commitment duration of carbon impact is radically enhanced by the graduation from 1.0 to 2.0. Whereas a "simple" CCA 1.0 program's use of RECs can commit to increased levels of mitigation for the two or three years at a time, a "complex" 3.0 program can lock in commitments for 30 years or more.

The horizon of DER penetration that is technically feasible in the transition from 2.0 to 3.0 is no less dramatic. Whereas a "simple" CCA 2.0 program installing exporting DER investment is limited by net metering caps to five percent of a utility's load, depending on location, a "complex" CCA 3.0 installation of non-exporting DERs can reach into the 75% to 80% range.[39]

The price volatility profile of CCA is also transformed in the shift from a 1.0 program to a 2.0 or 3.0 build-out. Whereas a "simple" 1.0 program using RECs has 100% exposure to volatile market prices, and even grid-connected 2.0 programs are exposed to regulatory risk from increased transmission as well as distribution and volumetric surcharge increases, a "complex" non-exporting DER-based 3.0 program has utterly predictable future costs and prices.

Finally, the actual price-points that determine the threshold between cost effective and not cost effective renewable energy for a consumer is transformed by the shift from 2.0 to 3.0. Whereas "simple" central renewable generation must compete against the cost of undelivered power on the grid, which is only 30% of the consumer's bill, non-

[39] Non-exporting systems are no longer limited by low voltage distribution systems, but the quality of renewable resources, building stock and locational energy requirements. See for example, Local Power Inc., "CleanPowerSF In-City Buildout Business Case," 2013; http://localpower.com/CleanPowerSF.html ; also Local Power Inc.,"Sonoma County Community Climate Action Plan Energy Element," 2008; Local Power Inc., "Sonoma County Renewable Energy Secure Communities," 2013; and Local Power Inc., "Boulder (Colorado) Energy Future - Localization Portfolio Standard: Electricity and Natural Gas," 2011. All are available at localpower.com.

exporting DERs compete against the cost of delivered power at the meter, which is 100% of the customer's bill.

The following summarizes the price risk of the three CCA versions:

a. **Simple, high risk** CCA 1.0s are 100% exposed to retail market prices, because all power and all RECs are purchased from volatile markets.
b. **Medium complexity, medium risk** CCA 2.0s partially reduce market risk exposure, because long-term investments made in fixed price renewables materially reduces how much and what times wholesale power is physically required by the CCA at volatile wholesale and REC market prices.
c. **High complexity, lowest risk** CCA 3.0s cut exposure to wholesale and retail market cost fluctuations, by eliminating not only required wholesale power, but also transmission and distribution, and other non-bypassable volumetric surcharges on kwh sales.

This explains the reason why CCA 2.0 programs are less likely to face rate premiums than 1.0 programs, and why 3.0 programs will have a lower market risk profile than 2.0 programs: because, by their very complexity, they establish increasing protection against ever-increasing wholesale energy market volatility.

2. DER cost optics inflated by simplicity of utility business models

"Cost optics" is a term to describe variations in price that result not from technology, installation or so-called market factors, but rather from integration factors definable by CCA program design.

Among the key barriers to 3.0 are program designs that needlessly imitate conventional utility programs, based on economic blinders resulting from technical dependence upon conventional retail energy professionals, namely energy brokers and retailers. The shift to 2.0 and 3.0 inevitably involves the removal of such blinders through the modification of program design. The key factors determining the price optics of DERs are:

a. **Cost to DER owner: exporting vs. non-exporting DER** Exporting DER economics are based upon the payment terms of utility net metering tariffs. Non-exporting DER economics are based upon avoided consumption at the retail rate of delivered power.
b. **Cost to all CCA customers: market-selected vs. load shape-targeted DER** Market-selected DER has an arbitrary impact on a CCA's daily load shape and annual load duration curve, creating savings for the DER owner, but having no impact on the aggregate CCA cost-of-service and resulting rates paid by the other CCA customers. Targeted DER reforms both load shape and load duration curve, resulting in reduced aggregate community-wide peaking and capacity requirements, thus lowering the cost of service for all CCA customers into the future.

c. **Cost of non-exporting DER: one-off vs. multi-site development** Higher engineering costs offset by lower acquisition costs make multi-site DER development significantly less expensive than one-off projects.
d. **Revenue-based vs. customer investment-based** Return-on-investment depends largely upon the ratio of money invested vs. borrowed. DERs financed solely on the existing monthly bill payments will have a higher cost of energy than DERs financed on both bill payments, and financing payments by customers actively investing in DERs through a fee or voluntary rate adjustment.
e. **Private vs. public finance** Depending on the customer and the time, public finance can lower the cost of capital, secure the cost of capital compared to federal tax exemptions, and increase customer participation levels, which also lower per-unit costs.

A CCA 3.0 program design that adds any or all of these elements together results in a significantly reduced DER cost optics, both for the DER owner and for all other CCA customers cost of service and resulting rates.

3. Customer engagement and demand diversity

CCA 1.0 and 2.0 engagement of customers is typically treated as a communication challenge, because customer participation is limited to (1) not opting out and sometimes (2) consenting to pay a premium for higher level of REC-mitigated grid power supply. CCA 2.0 programs with DER components have not presented DER products or packages, but tariffs that are standardized, cookie-cutter offerings like NEM or FITs, which the customer will frequently not understand, can either take or leave in isolation, with no direction or integration by the CCA to clarify the value proposition based on customer billing history it has on hand. In 3.0, however, customer engagement depends utterly upon the active, positive participation in DER investments. Communication is necessary, but has been inadequate, for this program, which must appeal to a much greater diversity of profiles in energy needs, situations and resources. Moreover, it must use complexity to package payment schemes into a diverse array of simple, easy to understand DER products.

A first layer of financial diversity to facilitate different kinds of customer participation, payment and collection are: (1) municipal bonds; (2) cooperatives; (3) CCA bill- or rate-adder; (4) state financing; commercial project finance; and (5) consumer credit. A CCA 3.0 program will bundle these resources into a variety of project/product financing options to match project profiles, tailored to customers' diverse credit ratings, wealth, and preferences:

a. Municipal revenue bonds or Green Bonds involve member municipalities' or a Joint Powers Entity's revenue bond-issuing authority.
b. Cooperatives add direct investment from local residents and businesses.
c. CCA bill- and rate-adders can be dedicated to pay for local shared renewables facilities.

d. State financing, such as Massachusetts' zero interest heat loans, can be used to finance fuel switching.
e. Commercial loans may be used for financing turnkey or PPA-based local DER projects.
f. Consumer credit may be employed to finance consumer-owned appliances and electric vehicles.

A second layer of financial diversity is DER sharing in three sectors: (1) power, (2) heat/hot water, and (3) electric vehicles. Power sharing assumes two forms: (1) virtual sharing, and (2) physical sharing:

a. **Virtual power sharing**
    i. In-city behind-meter sub megawatt renewables
    ii. Shared savings from customer-accepted peak-targeted measures
    iii. Grid-connected supply up to hundreds of megawatts depending on CCA load size and shape
b. **Physical power sharing**[40]
    i. In-building power cooperative
    ii. On-block solar power cooperative
    iii. In-neighborhood medium size PV .25 MW
c. **EV and heat and hot water sharing and co-ops**
    i. Sharing of renewable transportation, including EV co-op curbside scheduled EV V2B cooperative/rental/taxis/fleets
    ii. Sharing of renewable heat and hot water systems, including
        1. In-building renewable heat and hot water cooperative
        2. On-block renewable heat and hot water cooperative
        3. District heat and heat loops

4. CCA can provide the umbrella for a universal, multi-sector shares offering

CCAs can take over the primary energy utility relationship with customers, and redefine that relationship within an entirely new energy model. This uniquely robust umbrella itself, rather than any particular energy product or technology, is the key commercialization pathway to customer engagement. A customer data-targeted, multi-sector "push" marketing campaign on a trusted community platform can engage the whole community of participants in an inclusive, cross-sectoral transition to climate equity. Virtual and real equity offerings can reach any customer through diverse sharing options. CCA program complexity will estimate a "simple" customer return-on-investment for DER products, with a similar value proposition to solar PPAs. 3.0 customer equity products present simple payback metrics to enable customers to make apple-to-apple comparisons to current and CCA-forecasted future bills, and voluntarily sign on to a rate adjustment or fee tied to the ROI: a NegaWatt-hour equity rate that purchases CCA-administered equity shares from DER financing, presenting similar cash flow and cost/benefit characteristics as the direct ownership of DERs.

[40] Depending on state regulation, sites must be chosen, and sharing technologies be configured in a manner that does not constitute "distribution service," which falls under utility monopoly.

G. 3.0 Commercialization Pathways and Program Design

For nearly twenty years, environmentalists have called for a Green New Deal, presenting the image of a top-down, engineering-driven, large, federal government-sector infrastructure project to radically reduce America's carbon footprint, and transform the domestic economy. The problem is, that in many ways, this vision is flawed. Nearly a century after Roosevelt's New Deal, the profile of carbon reduction is primarily located in the private sector, not just the public sector. Its transformation involves not public works (though some of that has a role in DERs) as much as private works: a choice-driven, designed and interoperable as an aggregate resource, but inserted where people live and work, and operated, shared, and often owned by them. This is less "civil engineering" and more "Geek Squad": a bottom-up modular replacement of antiquated over-centralized transmission grids. Decarbonization will take place primarily in the *private* sector, be *data*-driven, and result in small, local-sector infrastructure that is largely owned not by the government, nor by banks, but by the residents and homeowners who use them. A Green New Deal must transform primarily the private sector if it is to have the scale of impact required by climate change.

CCA was originally created as, and is, a perfectly aligned platform for transformation of the private sector through the systematic use of local public sector planning and market powers. CCA 3.0, particularly, presents a commercialization pathway for local government to administer services and equity between residents, businesses and local government energy users. The platform involves a virtuous customer/citizen engagement cycle under which the active forces of government and the active members of the community cooperate to help the passive mass of residents and businesses to choose climate equity.

1. Program design to engage diverse DER customer interest levels

Customer diversity includes three basic categories of customer engagement:

a. **Default green** Defining the default product for a CCA at a minimum level of renewable supply that meets or beats the current utility rate establishes a maximum base level climate impact from the program. RECs may be used for this passive sector of the population, who neither opt-out nor choose a cheaper "alternative" lower renewable content supply product (which may be made available for customers wishing to avoid REC payments).
b. **Shares** This is a method of extending ownership benefits to customers who do not have the ability to own and use DERs in their homes and business because they do not own the building, or the building is not suitable for DERs. Irrespective of the default or alternative grid supply choice, customers may volunteer to "opt-up" by participating in DER equity through a DER shares product. Shares, which enable any customer to participate in any DER investment irrespective of location or credit rating, are a form of ownership under which a CCA and member municipality agree to allocate voluntary customer monthly rate/bill premium payments into a municipal loan repayment account, keeping track of the customer's accumulated equity ownership or

percentage of a DER facility, and crediting the customer's monthly bill accordingly. As a customer's equity/debt ratio increases, the CCA's monthly credit to his/her bill increases, according to a CCA-forecasted return-on-investment, much as a solar PPA company would provide to a direct purchaser of PV.

c. **Cooperatives** This is a method of facilitating both use and financial benefits from DERS in dense multi-user locations, and encouraging customer-driven innovation. Community leaders and activists who wish to actively drive the DER process by "opting-with" their neighbors to develop building-, block- or neighborhood-level cooperatives for physical onsite DER and EV sharing, are a critical and universally neglected organic, *avant garde* resource to drive both the local DER development and planning process. Cooperatives are also critical for energy democracy and procedural equity to inform and invigorate CCA governing board activities and decision-making. Under a cooperative arrangement, the CCA will create a standard application process and notify customers of its program. Neighbors seeking to develop a microgrid would apply to the CCA for billing services, and to its municipality for a loan, in a manner similar to shares, but including physical sharing and use of microgrid resources, such as physical power electric vehicles, HVAC and hot water.
d. **Individually owned DERs**. Finally, CCA 3.0 programs will offer financing for individual building owners who wish to both physically use and financially benefit from DERs

2. Renewable natural gas aggregation

While many green CCAs have eschewed gas aggregation because of guilt by association with fossil fuels, gas aggregation represents an opportunity no less impactful than electricity aggregation to decarbonize, reduce gas demand, and convert from fossil fuels to renewable fuels.

Like electricity aggregation, decarbonization is massively augmented by controlling procurement of the incumbent source. Considering the cost and greenhouse gas impacts of gas, fuel switching incentive programs are an anemic and under-achieving commercialization platform for natural gas reduction. As with electrical aggregation, scaling up investment in decarbonization depends upon diverting existing cost bill payment revenue streams to DERs. Many customers, particularly low income customers, pay their heating bill to natural gas suppliers, meaning fuel switching offerings that do not take over gas sourcing accounts, will not reach the vast majority of gas heating system users.

3. Administration of benefits

CCA administration of diverse DER charges and credits is a key support platform for 3.0. Logistically, administration will include the following basic transactional types:

a. **Customer finance, share credits and co-operative bill processing** Individual customer finance, equity shares and cooperative bill credits will be administered

according to signed customer financing agreement, electronically subscribed shares agreements, and signed cooperative agreements.

b. **Co-operative bill processing** Cooperative transactive energy/Saas management should appear as a standard service.
c. **Reduced aggregate community-wide cost of service** Load reform benefits will be monitored based on ongoing demand- and peak-related charges in grid power procurement, and will be reported both at the aggregate level indicated as a line item on each customer's web account, for educational purposes to help customers appreciate the benefit they receive whether or not they volunteer for DER participation.
d. **Energy efficiency funds administration** Administration of energy efficiency funds line items should indicate funds paid, benefits received, eligibility and subscription to receive energy efficiency measures.

4. CCA customer engagement process offers tailored products

CCA customer engagement consists of a multi-stage process:

a. **Contracts** DER products are defined by standardized finance contracts with customers.
b. **Data analysis/engineering** Customer offers are defined by analysis of aggregate and individual customer usage data.
c. **Mail** Targeted customer offers to each customer are made in scheduled municipal mail inserts, public email, or direct mail.
d. **Finance** Positive respondents sign financing agreements.
e. **Install** DER contractors are dispatched on a rolling schedule.
f. **Bill** Customers receive web- and or snail-mail-based billing linked to DER financing agreements.

5. Equity DER offerings engage customers in technologies through integrated products

Technologies include a virtual equity shares system, microgrids, shared EVs with Vehicle-to-Building (V2B) chargers, home/business Internet of Things (IoT) appliance systems and heating and hot water systems.

Products include purchase of bill credit rights, building co-operative membership, on-block EV car share with solar-plus-storage, IP appliances, and heat pumps.

6. Roles of municipalities

CCA 3.0 requires the partnership and cooperation of CCA municipal governments. While the CCA itself has unique access to essential utility user data, municipalities possess unique and necessary resources for low-cost engagement and support of customer DER equity. Specific roles for municipalities include:

a. **Mail** As customer DER engagement requires regular communication, use of scheduled mailing inserts are key to eliminating or minimizing the cost of such communication.
b. **Finance** CCAs comprised of multiple municipalities may need them to participate as counterparties to residents and businesses receiving DER financing.
c. **Billing** CCAs need member municipalities to provide access to ongoing billing platforms, such as water bills, sewer bills or tax bills, as a secure platform for financing.
d. **Data** CCAs will need member municipalities to share available data, such as land use, zoning and permitting data, for planning, customer targeting and tailoring purposes.
e. **Power/gas** CCAs need member municipalities to participate as customers in aggregated services as well as DER products in order to grow and balance community-wide loads.

7. Data use in CCA 3.0 launch sequence

CCA utility bill data is a critical dimension of all forms of CCA, particularly 3.0, being required for multiple stages of program launch, including:

a. Program goals and policies;
b. Implementation plan preparation and negotiation with suppliers;
c. Opt-out notifications and service launch;
d. Billing;
e. Targeting DERs for each customer;
f. DER financial analysis;
g. DER dispatch and account management;
h. Customer service and call center.

8. Datasets to design and target products

The following data sets are generally available for analysis and operation of a 3.0 program launch and operation, in order of importance:

a. **CCA customer meter data** This is available from utility CCA information tariffs during launch.
b. **CCA aggregate data analysis** This is available from utilities during the planning phase.
c. **Utility rates by customer class for forecasting** This data is available from published utility tariffs.
d. **Land use, infrastructure, planning data** This is available from municipalities and or state governments.
e. **Local and regional renewable resource data** This is available from state and/or federal governments.
f. **Customer credit data** This is available from commercial providers.

9. Data for DER site/customer selection criteria

Below is a list of typical meter attributes and building types that figure high on the list of selection criteria for major integrated DER developments and shared solar sites:

- **a. Meter attributes high priorities**
  - **i.** High coincident use
  - **ii.** High tariff
  - **iii.** Microgrid suitable
  - **iv.** Schedulable load onsite
- **b. Building type short list**
  - **i.** Government energy critical
  - **ii.** Commercial energy critical
  - **iii.** Multi-residential
  - **iv.** Farms and home businesses

10. Targeting and demand integration of microgrids

Targeting and design of a non-exporting system involves a combination of site selection based on building usage, and technology selections based upon physical sharing. Below is a list of land use and energy usage criteria for optimal DER integration opportunities:

- a. **Integrated demand**
  - i. **Live and work** These sites have balanced usage patterns.
  - ii. **Workday and weekend energy load** These sites have balanced usage patterns.
- b. **Integrated capacity**
  - i. **Power and heat/hot water** These technologies avoid need for batteries.
  - ii. **EV and home** These technologies share storage and onsite capacity.
  - iii. **Onsite renewables and appliance automation** These technologies manage intermittency.

H. 3.0 DER integration technologies

As an energy business model, CCA 3.0 is a strategy of replacing large power plants with many small local iDERs located on blocks of energy-intensive, aggregate load-coincident buildings. Taking advantage of unprecedented access to end-use meter data and energy modeling, 3.0 targets DERs according to the diversity of demand pattern by customer and community, season, and day. Generation technology needs to be assessed and selected according to local conditions, whereas technology sub-platforms that facilitate the integration of DER resources are the key commercialization pathways for those particular technologies, under the robust umbrella of CCA.

1. Energy technology model

CCA 3.0 technologies are defined broadly in displacement - serving conventional plug power, electric vehicles, and heating and hot water - but are specific in footprint, location and functionality, following the “loading order” principle of procurement planning, adopted by environmentally-minded state regulators such as California’s. The order prioritizes energy efficiency as the highest value, followed by conservation measures (such as scheduling, physical sharing and storage), then by onsite generation, then by local generation, then by regional generation, and finally, in-state generation.

2. Functionality: Non-exporting DER model

A conventional utility DER model employs a generic NEM or VNM-based power export model. under which the owner’s return on investment is forecasted based on compensation by the utility, which is based on the terms of a regulated export tariff. A 3.0 design employs a non-exporting model, targeting DERs to reduce onsite demand for power and help reform aggregate CCA load requirements, while integrating generation, storage, and automation among multiple customers, in order to eliminate the need for export tariff payments from the utility for a forecasted return-on-investment**.** The sub-components include:

a. **Onsite renewables with battery or heat/hot water storage** One, or both enable dispatchable capacity to supplement intermittent renewable onsite generation.
b. **Internet Protocol (IP) appliances** IP adds demand control to supplement intermittent renewable capacity.
c. **EVs with Vehicle-to-Building (V2B) reverse flow ports** These add additional flexible, shared capacity to supplement intermittent renewable onsite generation.

3. Communication, enrollment and administrative platforms

An effective CCA 3.0 program will seek to establish *trust* with residents and businesses, by accessing all available low-cost communication infrastructure to distinguish and reinforce the program's community-centered purpose In particular, regular communications with all residents and businesses in CCA-, member municipality-, utility bill- and local institutional communication platforms, will be designed to establish the CCA program's local, *public, community purpose.* An example of a public, community purpose would be a municipal recycling program. Trust is established by representing the program as a *community*-centered initiative centered around program *goals*, rather than merely a marketing program to consumers. Recommended mechanisms to establish trust include the following:

a. **CCA opt-out notification message** This follows state-defined protocol.
b. **Monthly utility bill CCA charge identification and information** This follows a state-defined, utility-administered protocol
c. **Web-based account management** This is CCA-administered and should include shares and cooperative registers.
d. **Customer call center** This should be run by CCA staff or a dedicated contractor.
e. **Municipal member direct mail insert** These would be prepared by CCA staff and administered by CCA member municipalities
f. **Municipal member public email distribution lists** These would be prepared by CCA staff and administered by CCA member municipalities
g. **Offers at participating local banks** These would be negotiated by CCA staff with local banks, which would make them available to customers.

4. Operational integration: Virtual Power Plants (VPPs), DER Management Systems (DERMS) and microgrids

a. Overview of dynamic energy management

Whereas virtual power plants (VPPs) optimize disparate DER resources to capture/monetize savings at the aggregate cost of service level, microgrids add resiliency for DER installation sites in cases of grid failures. Both are critical commercialization pathways for CCAs, VPPs ubiquitously and in the immediate term, and microgrids at key campus sites today, and ubiquitously for all customers in the near future.

VPPs rely upon software and smart grid technology to remotely and automatically dispatch and optimize DERs. This is accomplished via an aggregation and optimization platform linking retail to wholesale markets, dispatched and optimized distributed generation, appliance automation and onsite storage resources such as electric vehicles, batteries or heat and hot water systems, all in relation to central generation systems over large geographic regions in the wholesale market. VPPs are in this sense part of the Internet of Things (IoT), accessing existing grid networks to optimize electricity services for energy procurement entities, customers, and grid operators.

VPPs are adaptable to different market participants, from CCAs to utilities to DER providers, operating with or without central generation sources, monetizing demand response and critical peak pricing opportunities to replace the energy performance of conventional peaking power plants, energy supply and voltage regulation services.

Microgrids are retail distribution-level grid-tied or off-grid remote systems that can ‘‘island’’ their DER resources from the distribution grid using hardware such as inverters and high-speed switches, energy storage and load management systems, in order to operate specific energy resources in a specific location.

Distributed Energy Resource Management Systems (DERMS), administer services that are highly dependent on the specific location (grid connection) of each asset, by manipulating power flows along individual feeders, including voltage management, optimal power flow,
and locational capacity relief. Managing real power (watts) and reactive power, DERMS can increase load on one part of a feeder, while decreasing load, and ramping up generation at another part of the same feeder. DERMS typically require more back-end system integrations than VPPs due to the requirement of locational grid and asset state information.

In general, whereas VPPs are market-ready, DERMS require integration with the utility through Supervisory Control and Data Acquisition (SCADA)-type systems, and VPP platforms can be developed over time to DERMS, shifting from DER revenue optimization and wholesale transaction integration into real time energy management and voltage regulation toward the end points of the distribution grid.

M**icrogrids** face some regulatory and political hurdles, however they remain a strategic opportunity for local resilience and energy security:

a. **Island re-connect** While islanding from the grid in the event of power outages is not a problem, re-connection protocols must be established with utilities to avoid the voltage fluctuation impacts.
b. **Footprint restrictions** Some state rules, such as California’s Rule 21, limit the size of microgrids to three adjacent buildings.
c. **Rights-of-way restrictions** All states prohibit microgrids from crossing public rights of way. As many public rights of way are municipally owned and controlled under utility franchise agreements, however, CCA member municipalities do exercise important leverage over this question. Otherwise, microgrid site selection criteria should focus on single owner “campus”-type sites such as municipal government complexes, universities, hospitals, multi-residential buildings, and commercial complexes.

Microgrids are Low-Voltage (LV) distribution systems with interoperable DERs that provide power to onsite users either connected or disconnected from the distribution grid, including onsite renewable power, heating systems, storage devices (e.g. batteries, EVs) energy storage systems (e.g. hot water) and controlled loads (e.g., pumps, HVAC, appliances). In addition to onsite customer benefits, “microsources” in the microgrid can provide benefits to overall CCA performance.

With the restrictions mentioned, microgrids are present-, not future- prospect, taking time and effort to develop, but once achieved, offering significant resiliency and other benefits to CCAs and their customers. Microgrids have been online and proven throughout the U.S. for many years, with a significant wave of microgrid development already underway nationally. in recent years, driven by rapidly dropping solar panel and battery costs, leveraged players in the battery storage and control systems software space, state funding, as well CCAs responding to urgent calls for enhanced local energy resilience in an age of extreme weather, by including microgrids in their solicitations to energy providers and developers.

Moreover, CCAs are natural microgrid enablers, because CCA member municipalities:

a. often have mandates and resources to strengthen local extreme weather resilience;
b. typically own microgrid-ready energy-critical campus properties;
c. own public rights-of-way under utility franchise agreements;
d. have a special planning relationship with other local energy-critical public agencies such as school districts, and;
e. have unique leverage to command cooperation of distribution utilities, such that CCAs are natural pioneers in this important frontier of DER-based community resiliency.

VPPs are an energy management system that implements real-time control of available energy DER and grid resources to offset supply and demand variability and peaking. This in turn dramatically increases the cost effectiveness of DER technologies like photovoltaics. Operated as a single system, dispatchable supply and demand from a multitude of customer DER sites are balanced by a single peer-to-peer energy trading system to allocate energy benefits and costs among local customers, reduce aggregate CCA demand requirements, and reduce grid exposure and cost, lowering peaking and congestion. Ratepayers benefit from a reformed delta between base and peak loads, increasing capacity factors based on more differentiated characteristics of DERs. Flexible participation in VPPs leaves customers in control of their DERs and limits demand adjustments with barely noticeable frequency between load controls, storage and generation capacity.

VPP management systems appeared nearly a decade ago, but have entered a mature stage of development with the advent of cheaper batteries. In 2018, Tesla began deployment of solar plus battery storage on 50,000 homes in South Australia, and its project participants claim a 70% reduction in grid consumption, with bills cut by up to 30%. Sunrun is currently building a VPP in Hawaii.

VPPs are particularly well adapted to CCAs because of their ability to capture savings not only at the customer level and grid level, but also at among all customer accounts and the aggregate load duration curve level. Unlike most VPPs, which must transact among customers separately and market demand response products to third parties, CCAs can integrate VPPs as a CCA-specific energy management resource. As such, a VPP is one of the core operational models for CCA 3.0, in addition to “virtual” and/or “real” microgrids.

VPPs can be standardized for all participating DER customers. Microgrids may be enrolled through the following protocols:

a. **CCA administered web database** While dedicated blockchain-based transactional platforms for microgrids and virtual microgrids are commercially available, CCA energy management systems, can and should include microgrid (and VPP) capabilities. Annual or bi-annual snail mail reports are recommended.
b. **Building-level and block-level cooperatives** Microgrids are an important customer engagement and sharing platform, and will provide important long-term bulwarks to test and modify extant regulatory/utility barriers.
c. **Public building and business microgrids**
d. **Co-op reporting protocol**
e. **Ownership by co-op or municipality, according to commercial pathway**
f. **Resiliency**
    i. **Storage** EVs represent a massive opportunity for DERs and 3.0 (see the section below).
    ii. **Islanding** This temporary limitation is described above.

5. Sharing through transactive energy platforms

Apart from the municipal customer DER loan account approach recommended for CCA 3.0 programs, dynamic energy management systems, DER sharing and cooperative equity both require participant account management software not provided on utility billing systems. Transactive energy platforms can be provided as subcomponents of VPP-type software, or else by niche players in the “blockchain” space.

CCAs pursuing 3.0 may consider a range of software or service providers to employ and tailor commercially available back office software or software-as-a-service for CCA energy procurement, and administration of customer DER sharing and cooperative membership.

Transactive energy systems are distributed ledgers of coordinated energy devices and equipment, including generators, energy storage resources such as EVs, stationary batteries or heating systems and other appliances, which use automation tools to communicate and exchange energy based on the value of energy and capacity, and grid reliability constraints, in accordance with DER contracts that define the terms of consumer energy sharing and ancillary services.

In recent years, the power industry has witnessed the piloting of numerous transactive platforms designed for anonymous, location-neutral, private sector trading, often through self-monitoring distributed ledger systems, using web-based blockchain technologies, whether administered or un-administered. Because un-administered blockchain systems must self-monitor among anonymous parties with no trusted administrator, many existing platforms are notoriously energy-intensive, and thus potentially polluting. For this reason, some market participants are now turning to less energy-intensive trusted third party-administered ledger systems to overcome this problem.

Moreover, anonymous platforms are somewhat redundant for CCAs, which have all the opposite counterparty attributes, being locally-based and municipally administered with a public mission (rather than market participant) programs. The primary appeal of microgrid blockchains is a participation platform independent of utilities, which CCAs can already provide. Moreover, as CCA DERs primarily support aggregate community-wide energy and capacity requirements under CCA-controlled rate design and billing structures, their transactive energy requirements involve accounting mechanisms rather than market mechanisms, and are thus relatively simple in architecture.

That being said, a distributed ledger of some kind is a necessary addition to traditional utility supply billing as platforms for shared DERs, making them an appropriate part of a CCA's 3.0 program planning process. In general CCA should follow basic principles in developing 3.0 DER ledgers, such as "Common Pool Resource (CPR)" institutions articulated by Nobel Prize winning Elinor Ostrom, who identified "design principles" of stable local common pool resource management in a "Social-Ecological Systems (SES) framework," including:

a. Clear definition of the contents of the common pool resource and effective exclusion of external un-entitled parties;
b. The appropriation and provision of common resources that are adapted to local conditions;
c. Collective-choice arrangements that allow most resource appropriators to participate in the decision-making process;
d. Effective monitoring by monitors who are part of or accountable to the appropriators;
e. A scale of graduated sanctions for resource appropriators who violate community rules;
f. Mechanisms of conflict resolution that are cheap and of easy access;
g. Self-determination of the community recognized by higher-level authorities; and
h. In the case of larger common-pool resources, organization in the form of multiple layers of nested enterprises, with small local CPRs at the base level;
i. Effective communication;
j. Internal trust and reciprocity.

6. Electric Vehicles as storage

The market for plug-in EVs grew by approximately 70% between 2017 and 2018, and is expected to accelerate in the immediate future due to the declining cost of both the batteries and cars.

EVs with Vehicle-to-Building (V2B)-ready reverse flow ports, accompanied with V2B chargers, represent a strategic DER opportunity because, being voluntarily financed by customers when they purchase EVs, can substantially lower the cost of dispatchable DER storage, the expense of which can otherwise be prohibitive.

Ancillary services from EVs apart from DER storage include frequency regulation, reactive power and voltage balancing service to the utility grid, "last resort" stationary storage and Demand Response services.

"V2B," however, is distinguishable from Vehicle-to-Grid (V2G) charging in that control of battery charging and discharging is not placed under utility control, which has been a major sticking point for the EV industry, as it does not want overuse of its car batteries to shorten battery life. Customer control of charging is maintained by V2B to support in-building renewables within the limits of the daily charge and recharge cycle determining battery life, thus EV battery warranty terms.

That being said, progress is being made in V2G in Massachusetts, where Tesla has partnered on a VP with National Grid, under which National Grid will "request" power from a customer's Tesla Powerwall home wall mounted battery system (the hardware system is explained https://www.tesla.com/powerwall) for a few hours up to 75 days per year (roughly 60 summer days and 15 winter days), with a request event "almost every weekday" during the hottest part of summer. Tesla will charge the battery for best event performance and control battery discharge during the event. Otherwise, customers can choose how the battery behaves through a Tesla app to maintain onsite power in outages or other uses. Meanwhile, Powerwall owners get compensated for sharing their power. In Rhode Island, if a Powerwall is combined with a solar generation system, Tesla predicts the revenue can reach $1,000 per year, which can accelerate the payback time of a home battery pack (a Powerwall costs over $8,000 installed). Tesla's product, ConnectedSolutions, is a performance-based program under which a customer's revenue will be based on average power contribution during peak events. Tesla will manage the system "but does not guarantee any dollar value."

The highest-earning Powerwall systems are paired with enough solar generation to completely recharge the battery every day and discharge the most capacity during grid events, in which case a Powerwall could earn as much as $700 a year in Massachusetts, and $1,000 a year in Rhode Island. Powerwall systems not paired with solar generation will not be allowed to export power to the grid, but will still be able to discharge to serve home load.

Similar arrangements integrating services from batteries may be anticipated in the near future, and are thus within the immediate planning horizon of a CCA 3.0 program.

Unless a similar battery-warranty guarantor offers a similar service, Electric Vehicle to Building arrangements, which are currently being piloted by Nissan and on a significant scale in the United Kingdom, will likely follow an automated protocol to avoid increased cycling of batteries:

a. Customer consents to pay for variation;
b. CCA default with customer over-ride in building or EV;
c. Software limit to single battery discharge per day.

7. Heating and hot water DER in a carbon-free gas service

Apart from onsite DER-integrated battery storage, various forms of building heating and hot water integration into DERs represent a major strategic, cost-effective and carbon impactful commercialization pathway to implement critical cost-effective DER energy

"storage" platform. As mentioned above, Ohio and New Jersey CCA laws allow opt-out-based automatic enrollment of natural gas customers, which provides a major decarbonization and equity opportunity with potentially equal impactfulness to electricity CCA.

a. **Aggregation of regionally injected biogas** Deregulated gas markets allow for customer carbon-free gas swapping transactions that consist of contracting with agricultural biogas suppliers in order to inject carbon free gas remotely into gas transportation pipelines. This "swapping" gas qualifies as renewable due to the physical decarbonization of gas in the pipeline.
b. **Fuel switching to geothermal (cold zone) and PV-powered air source heat pumps** Onsite renewable electrically-powered geothermal heat pumps are a proven technology for decarbonizing home heat, and air source heat pumps have proven effective in moderate weather zones, though air source heat pumps have demonstrated some performance issues that are still being ironed out.
c. **IP thermostats and heating efficiency** IP thermostats are an extremely low cost measure to improve the efficiency of both electric and natural gas or heating oil building heating systems, and ought to be standard products of any CCA service.
d. **Heat/hot H20 loops and micro-districts** Physical sharing of heating and hot water systems in densely populated areas are an increasingly popular and cost-effective method of heat conservation.

I. 3.0 Governance, agency structure & program funding

In order to maximize and accelerate greenhouse gas reductions within one or more participating municipalities' jurisdictional boundaries, a CCA 3.0 program must organize its agency, funding and governance processes to support not merely the procurement of grid energy and RECs, but the engagement of customers and DER contractors.

1. A CCA 3.0 has four operational counter-party types

a. Electricity/gas suppliers
b. DER contractors
c. Individual Customers
d. Customer DER cooperatives

2. JPE Agencies

A CCA 3.0 agency structure involves a greater coordination of CCA staff with member municipal government resources, whether (1) singly by one municipality, (2) jointly in a formal partnership as a Joint Powers Entity (JPE), or in an arms-length partnership with a CCA agency.

3. Joint Powers Entity charter authority and program scope

a. A 3.0 JPE charter may include language addressing the following program purposes:

i. CCA - defining the energy procurement activities of the agencies as defined by a state CCA law;
ii. Electric vehicles (EVs) and charger infrastructure - defining member municipalities' ownership/control over public rights of way and planning processes, and articulating a policy for charger deployment, as well as the CCA's manner of marketing EV and Vehicle-to-Building (V2B) charger products to consumers;
iii. Natural gas aggregation (opt-out OH/NJ/NY, opt-in MA/IL/CA) - referencing state laws regarding aggregation of gas supplies, articulating a policy to use aggregation to market fuel switching to onsite renewable sources and storage;
iv. Specification of a lead municipal agency - authorizing a single member municipality to perform program administrator functions for the CCA program;
v. DER financing authorization - referencing municipal financing authorities under state law and articulating a policy for the use of these authorities to finance customer DER and municipal DER projects;
vi. Scope of services - articulation of the services to be provided by the JPE (CCA) and member municipalities (customer loans, use of

communication/billing infrastructure, shared DER arrangements on municipal properties).

b. For CCAs covering multiple utility control areas:

i. Same/similar implementation plans;

ii. Joint, combined or separate contracts.

4. Inter-municipal agreement division of CCA vs. municipal roles

Municipalities wishing to implement a CCA 3.0 program through inter-municipal agreement rather than formation of a Joint Powers Entity under state law should clearly outline the process and administrative structure of CCA formation as well as the roles and responsibilities of member governments, as follows:

a. CCA broad purposes, goals and criteria:

i. Power - load reduction, carbon, renewable content;
ii. EVs/chargers - integration as storage, reduction of gasoline/diesel in private sector and public fleets;
iii. Heating/hot water installations in homes, businesses and institutions - reduced carbon from natural gas and heating oil combustion through fuel switching, onsite renewables, storage and augmentation of non-exporting DERs;
iv. Universal shares offering - method of distributional equity and maximum carbon reduction through subtractionality via non-exporting DERs;
v. Customer-financed iDERs - distributional equity, subtractionality, and ;
vi. DER microgrids - reference to state laws and concerning microgrids, clarification of non-exporting interconnect permit strategy, high energy intensity site targeting strategy, and description of CCA support vs member municipality support activities;
vii. Billing support for customer cooperatives in a climate equity program that offers service to all customer classes, including:
    1. electricity customers,
    2. natural gas customers.

b. CCA member municipality roles:

i. Municipal loads and accounts - articulation of policy to include municipal accounts as CCA customers;
ii. Municipal buildings - articulation of policy to make member municipal properties available for retrocommissioning as universal shares sites;
iii. Municipal EV fleets - articulation of policy to transition fleets to EVs as renewable storage;
iv. Municipal hot water and heating systems - articulation of policy to make member municipal properties available for retrocomissioning of HVAC and hot water systems through fuel switching to onsite renewables
v. Water/sewer or other service bills for on-bill financing - articulation of policy by member municipalities to make available existing billing and communication platforms on a cost basis;
vi. Tax and scheduled mail inserts - articulation of policy by member municipalities to make available existing tax and scheduled mail available for CCA-related inserts on a cost basis;

vii. Financial engagement - articulation of policy on use of Green Bond authority by member municipalities and of preference for local bank, community bank, or credit union finance for projects not financed by Green Bonds;
viii. DER permitting, rights of way access, and staff participation in CCA product planning, installation and operation - articulation of policy of member municipality role in planning process and availability of municipal rights of way for EV chargers and EVs .

5. Focus internal capacity on DER, not power sales

A 3.0 agency will focus staff resources on development rather than power procurement:

a. Programmatic focus on in-town DER development, customer equity engagement, and finance;
b. Prioritize development and product offerings according to cost/ton carbon reduction analysis, aggregate load duration curve reform benefits, customer return on investment forecast, responsiveness/availability of vendors and customer demand.

6. CCA 3.0 agency tasks under any model

The 3.0 consultant will implement the following duties:

a. Procure wholesale power;
b. Co-draft implementation Plan either alone or with conventional CCA consultant;
c. Meet with city council and staff;
d. Pursue funding from available ratepayer-funded programs such as Energy Efficiency program administration funds, and state or federal grant or other funding programs;
e. Draft 3.0 elements of implementation plan and engagement of state energy and regulatory agencies;
f. Direct call center, customer service and customer engagement - complaint resolution with broker, retailer, wholesaler, DER developer, or utility, and communication of programs to consumers;
g. Direct data collection and management: customer, regulatory, building permit databases, grid, utility rates for all customer classes;
h. Direct account management and modeling; billing for iDER, billing for conventional CCA, customized web account and marketing platform;
i. Participate in member municipality planning; site evaluation, permitting;
j. Pursue finance - local cooperative lenders and small local bank lenders, regional project finance, work with financial advisor on financing diverse DER products and services;
k. Engage Labor - engagement of unions for job training, engagement of educational institutions to prepare jobs and existing local workforce training programs;

l. Engage Electric Vehicles and Chargers; engagement of EV companies for two way ports, engagement of charger companies for scheduled EV sharing at multi-site locations, engagement of customers for programmed EV sharing at microgrid sites, EV co-ops and personally owned individual or business EV buyers;
m. Engage local microgrid developers;
n. Engage Natural Gas Aggregation (opt-in or -out based on state law);
o. Engage Distributed Heat;
p. Engage Distributed Hot Water;
a. Engage Thermal Energy Efficiency Programs/IP Thermostats.

7. Legal and finance

a. Financial advice may be provided by bond counsel or a financial advisor.
b. Legal counsel may be provided by member municipal attorneys.
c. Legal counsel is required for a variety of activities, including:
    i. Required CCA implementation plan;
    ii. Energy efficiency funds administration;
    iii. State regulatory agency engagement.

d. **Creditworthiness**

    i. **Joint Powers Entity-run CCA** Depending on state law, some Joint Powers Entities (JPE) have revenue bond-issuing authority much the same as each member municipality possesses, except that, being a new agency with no financial history, a JPE must establish a credit rating with a rating agency. Thus, JPE Green Bonds will require that a JPE set aside surplus revenues to establish a reserve at an adequate level to receive a sufficiently favorable bond rating from a rating service such as Fitch, Moody's or Standard & Poors (S&P) to offer a sufficiently low interest rate on borrowing, and attract Green Bond buyers. For this reason, member municipality-issued Green Bonds are therefore indicated even within a JPE, based on each municipality's credit ratings.

    ii. **Financeability** A key element of JPEs not financially supported by the municipalities in which they are located, means that accessing capital for projects depends upon business models and "financeability." While the assessment of the long-term power purchase agreements (PPAs) value from CCAs with limited histories can be challenging, financiers are increasingly comfortable with discerning credit behind CCA business models which provide data, engage the financing community, and obtain external credit ratings. Securing public credit ratings is one avenue, but banks and other financiers can also establish "shadow ratings" for the larger CCAs. For unrated agencies, wishing to provide needed credit support on projects, extended contract timelines (e.g. 2022, 2023) allow the development of greater operating history. Rating agencies have designed special criteria for rating CCAs to evaluate metrics and develop

credit policies to align and further produce quarterly unaudited financials that can be sent out to the financing institutions to demonstrate progress.

iii. **Municipally-run CCA** Municipal credit ratings enable municipally-run CCAs to issue Green Bonds. In 2018 municipal credit ratings for Northampton was AAA, Amherst Aa2, and Pelham A2.

e. **Municipal-Customer Loan Finance/Green Bonds**

Green Bonds are a key resource for offering customer loans to all customers, including low-income residents and small businesses, primarily because Green Bonds provide CCAs with considerable flexibility, without excluding private or available state financing when available on better terms. Green Bonds create a stable structure for a multi-year energy transition build-out plan. Green Bonds can be used to finance renewable energy generating units and other revenue producing elements of CCA. They can be supported by existing municipal assets and enterprises, such as a water and sewer system, municipal gas service, public fleet infrastructure, or by new assets or enterprises such as renewable energy generating units or revenues from a contract with an energy supplier. Green Bonds and CCA are extremely synergistic. Together, they (a) provide the means to develop renewable energy and energy efficiency resources and the market to utilize and pay for those resources and (b) provide the CCA with a secure base of resources with which to serve its customers and, thus, avoid excessive dependence on a volatile energy market.

Whether the bonds will qualify for tax-exempt status and other factors affecting their marketability are dependent on the structure of the transaction being financed. Generally, in order to qualify for tax exemption, the facilities which are financed must be owned by the JPE or municipality (or other governmental entity) or operated by the JPE or municipality (or other governmental entity) or by a nongovernmental entity on behalf of the JPE or municipality pursuant to a contract that meets certain requirements prescribed by the Internal Revenue Service. Even if not tax-exempt, Green Bonds could still be issued to finance facilities which further a CCA, albeit at a slightly higher interest cost.

Without CCA, the renewable energy and energy efficiency projects would have to search for a market for the output. Without resources of Green Bonds, the CCA program could ensure the conditions of developing local renewables and energy efficiency across the whole community. Without a secure base of resources, a CCA remains extremely dependent on the energy market to serve its customers, including a majority currently under-served by private finance.

Apart from ensuring the timeliness and robustness of an energy transition buildout, the specifics of how Green Bonds are used in connection with CCA depends on what types of projects are to be financed. Three of the threshold questions that must be addressed are:

(i) what assets or programs would best assist with the implementation of CCA;

(ii) what revenue source will secure repayment of the Green Bonds;
(iii) whether the Green Bonds are tax-exempt or taxable.

The first two are somewhat related in that if the items financed do not have an independent or sufficient revenue stream to support the bonds to be issued, a separate revenue stream for the Green Bonds must be identified. The question of (iii) tax exemption will turn generally on the specific facts relating to ownership and use of the financed items, and is addressed further below.

(i) **Items financed** A local build-out plan will contemplate a number of elements to be financed. These include renewable energy generation, distributed generation utilizing renewable (e.g. photovoltaic), renewable storage technologies, and energy efficiency measures. This also includes the developmental costs such as preparation of solicitations/requests for proposals, environmental studies, and permitting, accounting and legal expenses, in addition to "hard-costs" of construction.

(ii) **Sources of repayment** CCA Green Bonds are "revenue bonds" which are to be secured by the revenues derived from fees and charges associated with the operation of an enterprise, including both automatically enrolled revenue and revenue from voluntary customer financing agreements for shares, cooperatives and direct ownership. Because share accumulation is a "virtual" form of equity, in which customer's entitlements as defined in Green Bond loan contracts may be defined as conditioned on payment, they may be retroactively withheld for non-payment, they present a flexible mechanism for managing default risk to Green Bond buyers.

Otherwise, municipalities may issue revenue bonds based on an inter-agency agreement with a CCA and a loan agreement with a resident or business owner who is a CCA customer. In the long term, an established CCA with reserves and a credit rating may itself issue Green Bonds. Under CCA 3.0 municipal bonds are recommended based on the first phase development of municipal government for shares program. Revenue bonds are commonly issued by state or local governmental entities and secured by the revenues of electricity or water enterprises or other revenue-producing enterprises. Generally, revenue bonds may not be secured by or payable from a municipality's general funds. Rather, revenues from an operating enterprise must be the source of security or repayment. This includes the potential use of revenues produced by a facility to be built with proceeds of Green Bonds to secure and repay those bonds, but revenues from other revenue producing enterprises may also be used as security in lieu of or in connection with revenues from a Green Bond financed facility.

In order to constitute permitted "revenue bonds," a municipality will need to identify a dedicated revenue source by which Green Bonds are to be secured and repaid, whether revenues of a new source or an existing source. As noted, a municipality can structure Green Bonds to be secured by the revenues from an existing revenue producing entity. Green Bonds can be secured by revenues from a new enterprise such as the CCA or facility such as a renewable energy

source which has not yet commenced producing revenues. For example, a municipality may issue Green Bonds for private or public sector ownership under voluntary agreements with a customer to pay a CCA rate premium to his/her CCA to the Green Bond loan account, as articulated in the 3.0 model. Either way, identifying the revenue source to repay the Green Bonds has the advantage of a logical connection between the bonds' purpose and source of repayment.

A disadvantage is the need to borrow additional moneys to pay interest on Green Bonds during the construction period until such time as the facilities can produce revenues to pay the bonds.

Such a structure also has "construction" or "completion" risk which may result in a slightly higher interest rate on the bonds. In addition, the revenue production of a new facility to be built is uncertain which may also affect the interest costs attainable.

Securing the Green Bonds with the revenues of an existing revenue producing entity avoids the disadvantages discussed above. However, such a structure does "tie up" a revenue producing enterprise of a revenue producing agency, specifically likely covenants required with respect to the enterprise securing Green Bonds. Municipal investment and voluntary customer investment provides additional revenue above CCA opt-out enrolled energy sales volumes, supplementing any direct investment or Green Bond participation by municipal governments themselves, whether alone as large energy users, or in renewable shares facilities as co-owners and users.

A potential "hybrid" structure is to use a combination of the foregoing structures. Under this alternative structure the Green Bonds could be secured by both a pledge of revenues from an existing enterprise and from any new enterprise. The pledge on the existing enterprise could be limited to the construction period during which the new facilities are not producing revenues or could be for the life of the Green Bonds. A variation of this alternative structure would be to create a single "enterprise" of the combined existing enterprise and the new facilities.

Another possibility would be to secure Green Bonds with revenues available from a contract with an energy supplier providing CCA services. Such revenues could be structured to constitute revenues of the enterprise(s) which would be the security for the Green Bonds. For example, lease payments received from an energy supplier would constitute revenues that could be pledged as security.

Ultimately, the projects the municipality desires to finance with Green Bonds will have a strong bearing on the security structure chosen. For example, if a significant portion of the proceeds of Green Bonds will be used to acquire or implement non-revenue producing programs, the use of an existing revenue producing enterprise will be required. On the other hand, if a significant portion of the proceeds are used to acquire revenue producing facilities, such facilities

or related activities could serve as the security and source of repayment for the Green Bonds.

In any event, a bond rating will be required for Green Bonds secured by new or existing enterprises that do not already have a rating. The credit quality analysis conducted by the rating agency will, among other things, focus on the "coverage" provided by the pledged revenues. Depending on conditions, the rating agencies prefer pledged revenues, which are 125% or more of the scheduled debt service on the bonds.

(iii) **Tax Exemption** Municipalities have a wide degree of discretion regarding the use of Green Bond proceeds broadly for public and/or private sector renewable energy and conservation projects, including customer-owned DER such as energy efficiency, onsite renewable storage, HVAC, and hot water. However, the particular programs and users of facilities financed with the proceeds of Green Bonds will impact whether the interest on such bonds will be tax-exempt under the provisions of the IRS.

In general, the "use" of facilities or items financed with the proceeds of Green Bonds by an entity other than a state or local government could result in such bonds constituting "private activity bonds." In that case, under Section 141 of the Code, the interest is not tax-exempt. Such use is often referred to as "private use". Private use is present where there is any type of privately held "legal entitlements" with respect to the financed facility. Nongovernmental ownership constitutes private use as does long term contracts regarding the output to be produced by the facility. For example, a long term contract with a nongovernmental entity in which that entity agrees to purchase the energy output of a facility will generally constitute private use. In addition, contractual arrangements with nongovernmental entities regarding the operations and maintenance of a financed facility will constitute private use, unless such contractual arrangement is consistent with certain contract parameters approved by the IRS. Bonds constitute private activity bonds if they meet either of the following tests:

- Both the private business use test ("Private Use Test") AND the private security or payment test ("Private Payment Test" and together with the Private Use Test, the "Private Business Tests"); or
- The private loan financing test "("Private Loan Test").

A bond issue meets the Private Use Test if more than 10 percent of the proceeds of the issue are to be used for any private business use. A bond issue meets the Private payment Test if the payment of the Implementation Plan of, or the interest on, more than 10 percent of the proceeds of such issue is (under the terms of such issue or any underlying arrangement) directly or indirectly:

- Secured by any interest in property used or to be used for a private business use, or payments in respect of such property, or

- To be derived from payments (whether or not to the issuer) in respect of property, or borrowed money, used or to be used for a private business use.

For purposes of these tests, the term “private business use” means use (directly or indirectly) in a trade or business carried on by any person other than a governmental unit. Use as a member of the general public shall not be taken into account.

A bond issue meets the Private Loan Test if the amount of the proceeds of the issue which are to be used (directly or indirectly) to make or finance loans to persons other than governmental units exceeds the lesser of five percent of such proceeds, or $5,000,000.

It should be noted that loans of the proceeds of Green Bonds to a non-governmental person or entity will generally cause the Green Bonds to fail to qualify for tax exemption. While these financing options will thus have a higher interest rate, their availability to all customers will guarantee eligibility irrespective of credit rating.

Therefore, the facts regarding the ownership and operational structure of the financed facility will determine whether the bonds may be issued as taxable or tax-exempt. If a municipality (or agency of a municipality with its own bond rating) owns and operates the facility, and if the power is delivered to customers of the municipality, then the facility will probably qualify for tax-exempt financing. It will also be possible to qualify for tax-exemption if the municipality contracts the management of that facility to a private party. On the other hand, if an energy supplier or other nongovernmental entity owns the financed facility or operates it pursuant to an arrangement that does not meet IRS requirements, it will probably not qualify for tax-exempt financing.

Green Bond proceeds can be used to fund energy conservation programs. However, to the extent such purpose is accomplished through a loan program wherein residential and business customers can make use of low interest loans in a CAA program to make energy conservation and efficiency improvements, the loans of bond proceeds will cause the program to not qualify for tax exempt financing. Grants of bond proceeds could be made to individuals and businesses for conservation and other expenditures so long as an adequate project revenue stream is identified to secure and pay the bonds. The purpose of using Green Bonds is not merely to save on interest, but to guarantee a universal offering of shares to all customers, irrespective of their credit rating. The advantage of shared renewables facilities finance on municipal and public institutional buildings is to reduce costs through a lower interest rate for municipally owned or tax exempt projects, and to avoid dependence on continued availability of outside sources for the full term of a community energy transition, specifically to ensure that financing is consistently made available to all customers throughout the multi-year term of energy transition.

Green Bonds are not tax-exempt where customers take title to and legally own installed systems, however that does not in and of itself make such a program/products nonviable. Taxable rates on such Green Bonds could potentially still be substantially less that the rate of interest otherwise available on loans to the majority of residential customers who are low, fixed and middle income and/or small businesses.

Finally, there are a number of ways Green Bonds could be used to finance renewable energy facilities. This can be accomplished either in a structure wherein the municipality (or other local government) undertakes acquisition, construction, ownership and management of the facilities or through structures wherein an energy supplier undertakes some or all of the activities. As noted, the tax-exempt status of Green Bonds varies depending on the structure. Structures wherein an energy supplier takes on one or more of the roles present issues under the Private Business Tests discussed above. Any lease or other similar arrangement with an energy supplier would likely result in the Green Bonds being categorized as taxable "private activity bonds." Again, such a result would not prohibit the structure but rather would result in a higher cost for the program.

8. Staff funding from startup to full scale

Initial startup staffing requirements are an executive with a data assistant. An operational CCA will require one engineer, and CCA build-out will require a project manager. Full scale will add three or more project managers, as well as legal counsel.

9. CCA 3.0 administrative funding sources

Funding sources for the 3.0 Office and Consultant will start small and grow according to the following estimated schedule of tasks:

a. Startup funding prior to service and adder collection should be provided as a loan from general funds of one or more participating member municipalities or local lender to the CCA;
b. The timeline for funding should be two years for implementation, and cover policy and regulatory staff and consultants;
c. Funding should cover two years for financial and legal advisor;
d. The administrative adder at commencement of services can support two or more additional full time staff members;
e. A percentage of annual surplus revenue to grow into a full time staff of ten or twenty depending on size.

10. Uses of CCA adder

CCA bill adders have been authorized for multiple purposes, and no regulatory ceiling has been established, leaving only limits of remaining competitive electricity bills. Adders must be authorized by state regulatory commissions, but are otherwise available to fund a wide variety of activities:

a. CCA Program Administration;
b. Customer equity share credits;
c. Operational sharing (EVs, microgrids, onsite renewables, heat);
d. Ownership/possession (energy efficiency measures, individual customer ownership.

11. Administration of ratepayer energy efficiency surcharge payment funds (MA, CA only)

Energy efficiency surcharge administration funds represent ten times the funding volume of any other source:

a. Cape Light Compact collects more than $40M per year in energy efficiency funds revenue, resulting in a highly innovative, model program.
b. Marin Clean Energy has control of a $6-9M per year energy efficiency funds revenue, lesser compared to Cape Light Compact considering CLC has a smaller Cape population than that of the five Bay Area counties MCE covers.
c. Surcharge payment funds are a strategic path to funding CCA 3.0 staff.
d. To secure tens of millions of dollars per year in existing ratepayer funds dedicated to local installation into the future, CCA must provide funding of legal counsel and an energy engineer for two years of application to state agencies before funding arrives.

12. Ways to avoid energy efficiency funding requirement constraints

a. California
    i. CCAs can “elect” to administer a small portion of Public Goods Charge (PGC) funds collected in their jurisdictions or “apply” to administer them.
    ii. Functionally, to elect means that a small portion of those funds passes through to the CCA. To apply means potentially claiming a much larger amount of funding, but requires a cost-tested fully developed energy efficiency plan to be filed and approved by the CPUC.
b. Massachusetts
    i. Coordinated, co-funded applications can be made to DPU for funding with a common legal and engineering team.
    ii. CCA administrator can participate in State Energy Advisory Board.
c. Other states
    i. Energy efficiency can be an operational adder or rate.

J. 3.0 CCA management and internal capacity

1. (Option 1) Going wholesale: CCAs as certified retail certified suppliers/Load Serving Entities

The success of California's 2.0 model in delivering major investments in local and in-state generation lay primarily in developing the required internal public staff, knowledge and planning capacity to drive innovative DER technologies. CCA programs that depend upon outsourced procurement services do not learn or develop their own capacity. Suffering limited knowledge and control over their portfolio strategy and energy services, outsourced programs simply have not achieved anything close to the green investment and decarbonization results by CCAs that perform program functions in-house.

2. Advantages of CCA accessing wholesale supply directly

There is an old saying that you will not get different results from doing the same thing. Market design is the key to market transformation, not a mere detail that can be left alone. While outsourcing has been successful in propagating hundreds of CCA programs relatively effortlessly during the early development phase of CCA, this method has delivered theoretical "incentives" for investment in renewables, but very little actual investment. Instead, CCAs in Massachusetts, Ohio and Illinois have generally remained fixed within a limited paradigm of system power with Renewable Energy Credit mitigation, and are only now awakening to new opportunities years after the truly exponential leaps have been made in California, where a *new method* was devised, based on the lessons learned 20 years ago: CCA 2.0.

The key change under 2.0 was that CCA outsourcing to brokers and retailers was eliminated. By hiring staff to launch their programs and learning as organizations to break down and manage energy program components into integrated and interoperable parts, California CCAs have proven able to accelerate the pace of energy localization, investment and decarbonization at an exponentially higher level in just a few years than CCA 1.0 programs have accomplished in a quarter century.

CCAs enjoy the following advantages by bypassing the energy retailer as well as the broker, and going straight to wholesale suppliers:

a. Gaining internal staff knowledge and capacity to drive program development, and conveying this effectively to decision-makers for necessary approvals;
b. Gaining control of communications with customers, a key element in gaining their trust for engagement in DER investment and services;
c. Capturing direct savings from avoided demand in the form of avoided peaking and reduced capacity costs;
d. Ability to target and use iDERs to reduce aggregate cost of service, and share the savings between participating customers and co-ops and integrated DER (iDER) users;

e. Using all of these advantages to achieve a lower cost of service for much greener programs, resulting in far higher greenhouse gas reductions.

From 2011 to 2018, California's CCAs directly procured 24 terawatt-hours of RPS-eligible electricity, nearly *half* of which (11 TWh) is "voluntary," or *in excess of* California RPS compliance requirements.

Communities are very unlikely to achieve the levels of decarbonization and local green investment that is being achieved by California's CCA 2.0 model if they continue to employ 1.0 methods. California's exponential leap in green investment is the result of CCAs planning and negotiating directly with renewable generators and renewable developers, rather than following the 1.0 model of procuring financial products from retailers and REC marketers.

Energy retailers, which purchase wholesale supply and sell it to the end user, provide the following core functions (and complexity level) for CCA programs:

a. Provide credit/collateral - high complexity;
g. Procure wholesale power - high complexity;
h. Supply electricity to end users - medium complexity;
i. Meet grid operator (ISO) requirements for load profiling and delivery - high complexity
j. Process customer enrollments - high complexity;
k. Send opt-out notice and manage replies - high complexity;
l. Utility data exchanges (e.g. Electronic Business Transactions, Meter Data Management System,) and CCA customer data management (in most cases) - high complexity.

Wholesale supply opens up a whole new universe to CCAs. By going directly to wholesale supply, CCAs have a choice of physical suppliers rather than the generic "system power," that all CCAs otherwise receive. System power is mitigated by varying qualities of RECs, while a typical California CCA has not one but dozens of suppliers, and can choose which to sign into longer-term contracts (such as new renewable facilities they wish to develop), and which to limit to shorter-terms (such as conventional generators).

Whereas CCA 1.0 governing boards typically learn little from the process, CCA 2.0 and 3.0 programs are hands-on with a steep learning curve for staff and decision-makers. CCAs don't just shop for the cheapest power they can find at undisclosed locations, mitigated by credits to "green" them: they tailor portfolios of specific renewable facilities, based on generation type, location and community impacts. The 19 micro-agencies serving the 10 million residents and businesses of 161 California municipalities today employ mission-driven staff and development- focused consultants to analyze data, implement, plan and manage scalable projects. For this reason, the transition to new local renewable resources can be undertaken by CCA governing boards in an accelerated manner, through an informed and diligent integrated process. The main ingredient to this transformation is a new level of internal administrative know-how to directly manage both grid power supply contracts and local DER projects/products under a single plan.

By taking aggregation plans and other broker functions in house, and negotiating directly with wholesale suppliers, California CCAs gained the ability to capture savings from reduced grid power (such as the "load reform" strategies described in this report) that are otherwise lost to the retailer under conventional retail supply contracts "Going wholesale" open up strategic opportunities to recapture savings from DER-reduced grid load that are otherwise taken by energy retailers, making higher levels of green power investment possible while maintaining competitive rates. Thus, the horizon of *economically feasible* greenhouse gas reductions is vastly expanded.

3. Disadvantages/risks of becoming a retail supplier in a "heavy wholesale" approach

California's model creates something closer to a wireless utility than a community-wide aggregate purchasing program. This "heavy wholesale" approach involves a greater degree of commitment from political decision-makers to create such an agency, which can be a disadvantage for winning their approval. A "heavy wholesale" approach requires several steps.

a. First, CCAs that elect to perform the function of a retail supplier, procuring electricity directly from a wholesaler, must provide substantial funding for numerous staff involved in energy procurement.

b. Second, the need to support 30-50 staff performing virtually all the functions of a utility except transmission, distribution and customer billing, caused most California CCAs to form large county-wide aggregations to achieve an adequate scale of revenue to cover administrative costs.

c. Third, the resulting increase in CCA agency scale can present potential obstacles for CCA DER deployment, because regional agencies tend to favor development of larger, centralized, agency-owned renewable energy facilities, a disadvantage in engaging customer investment of members of the community in smaller, onsite DER technologies, a key goal of CCA 3.0.

d. A final challenge of becoming a certified supplier or Load Serving Entity is the financial requirement for participating in wholesale markets. California CCAs that enjoy a fully integrated procurement enterprise by purchasing energy directly from wholesale suppliers, must provide their own credit and collateral to provide security on structured pricing commitments from wholesalers: a role otherwise performed by the retailer. While they are committed but not spent, this process requires a threshold level of political support by local leaders, often working with limited funds, to win the votes necessary for approval.

4. (Option 2) Certified Retail Suppliers

There are no statutory prohibitions against CCAs becoming retail suppliers or Load Serving Entities within extant CCA laws. While it is possible for state regulators to raise

issues, there are no known legislative or regulatory changes required for a CCA to elect this method.

5. Compromise: (Option 3) "Light Wholesale" approach

Apart from the choice between these options, prevailing market practices present a third option for large energy users that CCAs could also use, namely to retain an already existing certified retail supplier to provide a wholesale-to-retail energy service. This approach would be an open-book procurement method in which the CCA administrators/managers are fully stewarding energy procurement on a subscription/services basis.

In the "light wholesale" approach the CCAs maintain a smaller core staff and contract with firms to transparently access the wholesale market without actually becoming a certified retailer. This would involve selecting among firms that provide this service to municipal utilities, large commercial and institutional energy buyers, as well as energy brokers and retailers. Under this compromise approach, grid operator (Independent System Operator, or ISO) scheduling, Federal Energy Regulatory Commission (FERC) and U.S. Energy Information Administration (EIA) reporting, billing, settlements, cost allocation, reporting for load and generation, peak load forecasting and renewable facilities integration would be undertaken by staff through the same entities that advise municipal utilities, brokers, energy retailers and generators.

While retail electric suppliers typically buy power from the wholesale market and then sell it with a premium to the end-use customer, firms are available to allow CCAs and other large consumers to purchase directly from the wholesale power markets.

Wholesale electricity management services provide more direct access to the wholesale electric markets, essentially enabling them to act as their own electric supplier and capture the savings of doing so for ratepayers and reinvestment rather than to the retailer.

This approach presents a less disadvantageous method of gaining the control and knowledge that comes with becoming a retailer, though it will require CCA member municipalities to pay a fee to the wholesale services company to provide the credit/collateral and take title to the power. For example, one company queried gave an estimated buyer's fee for contracts in excess of $100,000, at 0.75 percent, or about one half (1/2) of one mil per kilowatt hour.

This method presents a "lighter" load for the CCA by engaging a qualified market participant to provide the collateral to procure wholesale power without having to fund a 30-50 employee micro-agency. This method, which is a not uncommon practice among large energy buyers in Massachusetts and other East Coast CCA markets such as New York, will enable a CCA to maintain smaller staffing budgets, while empowering those staff to achieve the level of control and transparency in grid power procurement, in order to augment the kind of scaled deployments of DER in the early years of a program equivalent to those in California, as compared to a conventional retail supplier.

6. How “light wholesale” works

Because CCA 3.0 (and 2.0) is less focused on obtaining short-term rate reductions, and more on maintaining competitive rates while delivering savings through renewable investment- and energy efficiency-based customer and aggregate bill reductions), a *lower-risk* approach to procurement is more feasible, as outlined below.

An “Index Plus Block” approach to power procurement contracting, and/or pass-through charge provisions on capacity and RECs, are bid specifications that would apply in a wholesale CCA 3.0 program. It would do so by enabling the CCA and its customers (including reduced cost of service and accompanying rates and bills from avoided load), to benefit starting day one. The benefit would come from reduced ongoing supply-side energy, and capacity requirements replaced by local DER, whether in microgrids, VPPs, or DERMs as well as individual customer-owned demand response, energy storage and renewable systems.

To hedge against escalations in the price of the electricity supply offered to 3.0 program participants, a "heavy wholesale” approach would include an ISO sub-account structure to allow the CCA to buy directly from the wholesale market and hedge against escalations.

Competitive block purchases can significantly reduce the overall $/kWh rate in a “light wholesale” approach. Competitive block purchases would employ the method of fixing blocks of the aggregated load at various times based on wholesale market opportunities, and to float a small portion of the aggregated purchases to monetize load reductions in the day-ahead market. To the extent possible, this approach will use real-time analytics from meters and energy management systems to limit the risk of $/kWh increases.

Whereas “collars,” or volumetric thresholds, are expensive ways for CCAs to hedge the risk of price increases, this approach will minimize the per kilowatt hour price ($/kWh) of electricity through a targeted program. This program is based upon a cost of service analysis of customer-specific end-use meter data, in order to achieve aggregate load reform in the seasonal aggregate load duration curve, customer grid load reduction at the building level, and overall average energy demand reduction. This is accomplished through an aggressive regime of energy efficiency measures based upon energy efficiency funds administration, as well as various forms of energy efficiency finance and DER finance.

Grid power procurement-specific strategies such as the ones described should not be made in a vacuum without load data collection and basic analysis as well as consideration of basic CCA program design principles. A low-risk approach to power procurement is advisable.

In procuring renewable energy for a CCA’s “default portfolio,” procurement will focus on long-term contracts with local (within-CCA) projects, ensuring stable premiums and promoting local renewable energy projects. These contracts are generally unit-contingent. The CCA’s approach will be to sign contracts projected (as in the California

CCA market) to generate more RECs than is required for the CCA program under state law, with the knowledge that the town or city can retire RECs not needed for the program to other entities.

7. "Transition" strategy to either wholesale model by in-sourcing broker functions

California's leap into renewable investment resulted in part from accessing wholesale markets, but also from funding and engaging staff rather than hiring brokers to manage procurement.

CCAs that wish to launch using a certified retail supplier but change over to one of the two wholesale CCA service models above may employ a "transitional" launch strategy. The transition strategy is one in which broker functions are performed in-house by the CCA Director, who negotiates the retail supply agreement, hires and contracts for expertise to implement 3.0, selects the wholesale strategy, and undertakes measures to launch at the expiration of the initial retail supply agreement.

A good example of this approach is Massachusetts' first CCA program, the Cape Light Compact, which is served by retail suppliers but not brokers. By its own admission, it gained a number of advantages from dispensing with an energy broker, and in-sourcing broker functions and negotiating directly with retailers.

a. Broker roles

In Massachusetts, the broker's responsibilities typically include the following tasks and assessment of complexity:

i. Develop a CCA Implementation/Aggregation Plan - medium complexity
ii. Secure necessary regulatory approvals - medium complexity
iii. Manage negotiation with retail energy suppliers - higher complexity
iv. Conduct customer education - low complexity
v. Oversee supplier performance - low complexity
vi. Data management (in some cases) - higher complexity

b. CCA insourcing changes

Under a Massachusetts direct retail 3.0 model, insourcing would involve what have been broker functions and optionally, some functions that retail suppliers typically handle, although this is not necessarily needed:

i. Broker roles listed above replaced by CCA staff
ii. Broker fee adder remains in the CCA budget
iii. Data management and billing under CCA staff
iv. Portfolio/DER investment strategy under CCA staff
v. Direct negotiations with retailer under CCA staff
vi. Retailer provides collateral and captures capacity savings
vii. Implementation plan filing, state engagement under CCA staff
viii. Renewable energy development under CCA staff

ix. Energy efficiency program administration under CCA staff

Grid power procurement and distributed energy resource development and operation need to be an integrated single process, not a separate, outsourced function.

Apart from the governance benefits and avoided cost of brokers fees and retail capture of margins, there is the critical operational business model benefit from developing internal staff capacity to manage and plan, identify, contact, offer, and enroll customers in on-site, block, neighborhood, and in-town renewables.

Customer investment depends on the use of rate design and operational account integration, not siloing, to facilitate a CCA-based loan facility between a CCA and its member municipality. Specifically, the operational separation of data management/analysis from grid energy procurement decisions, thus between DERs and grid supply is not feasible for the following reasons:

Operational integration is key to this design. This is not a smattering of solar panels but a real-time integrated resource whose value to wholesale level procurement is to monetize a reformed aggregated load and capacity requirement, the key actions for rapid and sustained physical decarbonization, rather than incentivizing.

Microgrids, virtual power plants, and Distributed Energy Resource Management Systems (DERMS) generally involve operational integration of behind-the-meter resources with conventional grid power procurement. A single database is employed to monitor generation, storage levels, and dispatch. Moreover, customer usage data bridging grid demand and locational conditions is essential for developing distributed energy resources, particularly calculating and presenting a CCA rate packages based on forecasted loan repayments. To each and every customer, therefore, a functional separation of grid power procurement from DER development and operation is quite unworkable.

Apart from hobbling targeting and acquisition, billing systems serving both power bills and loan payments must be employed by trusted local agencies. The integrated database is the enterprise operating system with a protocol for loan accounts by municipal governments. This describes a database Internet Protocol backbone using enterprise software. It is the central, internal planning and management resource to establish under CCA storage and use to coordinate and perform back office functions of the program. Municipal loan systems will be relatively simple and a subset of existing utility charges or water, sewer, garbage, property taxes, as available, with terms populated by a loan agreement under an Inter-Municipal Agreement or joint Powers Entity Charter. The administrator will be managing a diversity of activities among many separate companies according to local policy goals and targets.

c. Advantages of insourcing

An integrated business model with an equally integrated administrative system are required for CCAs to achieve the kinds of leaps in local development that CCA 2.0 in California produced in centralized renewable development: an essential infrastructure of CCA 3.0 to shift firmly from the financialized model of 1.0 (based on outsourced financial services and power contracts, not local redevelopment activities or customer investment) to an interoperable distributed renewable power, heat, and transportation model, which will target and coordinate on-site generated energy and storage.

An integrated business model (cost model and financial model resulting in a profits and loss sheet) is imperative. Under the CCA 3.0 model, the 30 to 50 employees of CCA 2.0 in California are not required, but the outsourced zero to two staff model of CCA 1.0 through outsourcing is untenable. CCA 3.0 occupies the mid range requirement of 8 to 20 staff, by focusing not on financing, not financialization, and creating and administering local customer products and projects, not building large centralized renewable projects.

In terms of imagining what this looks like, planning, establishing procedures and contracts, engaging in governance for guidance, and managing contractors for a dozen or more parallel products and redevelopment project silos are the main activity of this micro-agency's employees and consultants. Apart from data, communication, and power procurement, staff resources are focused on managing a specific community energy transition process.

Key to this model is the member municipality side, with a simpler program design limited to two counterparties: (1) the residential or business customer, for loans; and (2) lenders and bond buyers.

c. Advantages of in-sourcing the broker role are as follows:

i. Elected officials typically lack technical energy knowledge: a successful, impactful 3.0 buildout benefits from having an empowered locally-based public servant reporting and making recommendations to the CCA governing board, rather than a year-to-year contractor, who is otherwise the only informed advisor to elected officials.

vii. No ongoing broker fee: as the rate increment otherwise paid indefinitely to a broker funds staff, CCA startups will enjoy a needed increment of revenue upon which to build capacity, and develop programs that will provide additional sources of revenue to further expand programs.

viii. Energy democracy: CCA 3.0 depends specifically upon customer and citizen engagement, which outsourcing serves poorly and insourcing specifically empowers.

d. Disadvantages of in-sourcing broker functions

If start-up commences without a broker, it creates the need for startup funding to cover staff and consultant expenses during the first year, before customers are enrolled and

monthly revenues begin to flow. As mentioned elsewhere, this may be provided by a loan to the CCA, recoverable within the first few years of the program. Moreover, this inconvenience is counterbalanced by energy democracy and governance benefits of committing funds to the program during the formation period, as discussed elsewhere in this report, when decision-makers, member of the community, and the press are focused on policy decisions.

8. 3.0 technical lead qualifications

CCA 3.0 agencies depend upon interdisciplinary policy/CCA specific/DER market/public education leadership and highly focused DER-only support staff to implement programs: not utility experts, energy brokers, traders, or merchant generators. The boss is focused on DER work done primarily by a consultant, government planning work, and lastly, dealing with the retailer, with back office functions handled by a dedicated customer service department run by the CCA manager and staff.

Outside California, CCA 1.0 outsourcing has been the rule, with brokers setting up programs in return for short contracts, collecting an increment on the energy sold. The Cape Light Compact (NY), Southeast Ohio Public Energy Council (OH), Westchester Power (NY), Sustainable New Jersey (NY) are examples of insourcing, and are not coincidentally some of the more 3.0-oriented CCAs in their respective states.

Insourcing does not mean that CCAs don't employ consultants, but rather that they serve program development functions for, rather than dominate, program management. In contrast to a broker, a CCA 3.0 consultant is principal of a technical project to set up a mini-agency and training CCA-hired staff as program elements are established. As launch activities become operational, staff are trained by the consultant in the management of established functions, and take over responsibility for those functions. Consultant resources are thus focused on designing and implementing innovative suites of 3.0 components, including setting up a customer engagement and account management platform, as well as a data collection, management and billing system.

A good CCA manager will be capable of negotiating supply with retailers and wholesalers, but this will be the simpler part of the job, with some experience or familiarity with many facets of 3.0 necessary for a robust and successful launch of CCA 3.0. The managers behind 3.0 are generalists who know enough to enlist the help of competent experts.

A major responsibility of the CCA manager will be to hire staff specializing and focusing on implementing groupings of these skill sets, and having enough of a grip on the nature of DER integration coordination, under a well-designed program, to be capable of evaluating and selecting the right skill sets, a multi-tasker who can cover several different bases, power/gas, data/DER, and municipal agency partner agency coordination, while also launching the program under state regulatory protocols centered around an implementation plan, in parallel. The first year is ramping up DER contractors to start installing, soliciting information, qualifications and proposals, and perfecting customer engagement platforms.

CCA programs should seek an interdisciplinary and program design/setup-oriented chief. While a chief may not directly have experience with every skill set, they must know enough of each of the following qualifications to be able to build the team that does:

a. Generic familiarity with CCA rules;
b. Generic familiarity with CCA supply cost models;
c. Generic familiarity with local government processes, governance, and protocols at public meetings;
d. Generic experience in state regulatory commissions and legislatures;
e. Experience in CCA rate design, business model drafting, financial models and Profit-and-Loss sheets;
f. Experience with RFPs and negotiation with energy suppliers;
g. Experience analyzing performance, risks and costs of DER technology types;
h. Experience in customer bill analysis and cost forecasting, tariff analysis, load analysis wholesale cost of service forecasting;
i. Municipal, commercial RE/EE finance and familiarity with conventional DER loan and co-operative structures;
j. Experience collaborating with municipal water agencies and public works departments
k. Direct mail, materials design, graphics and web design experience;
l. Site acquisition, type approval and logistics;
m. Experience with municipal planning, municipal permitting;
n. Experience with state regulatory, policy and funding agencies;
o. Knowledge of municipal operations, procedural norms, and forms of intergovernmental cooperation;
p. Experience guiding municipal public meeting processes and community educational event organization;
q. Experience in energy efficiency program design and funding;
r. Knowledge of issues related to microgrid design, permitting and transacting;
s. Experience collecting, managing, and analyzing utility customer billing data, aggregate load duration curve data, and peaking and capacity factor data, as well as available municipal list and GIS databases, and experience working with database engineers to assimilate and geocode different formats, nomenclatures and protocols.

K. 3.0 Next Steps

These vary slightly by state, but the following is an approach to 3.0 outside California's unique wholesale structure. Full wholesale 3.0 will add steps, again according to retail energy rules, which differ accordingly in both nomenclature and protocol:

1. Local next steps

a. **Launch planning**

i. Set a date for approving an implementation plan, choose staff point person;
ii. Schedule a monthly hearing schedule for two years, and request CCA member municipality agency heads to participate as expert witnesses at regular meetings;
iii. Governing board adopt a letter requesting partnership with member municipalities, and solemnized in a letter of intent, request planning director to write a memo outlining required permits with estimated months from permit application submission to permit received, including the local distribution company's anticipated interconnect timeline on non-exporting systems;
iv. Request bond counsel from legal counsel, to provide a letter describing and attaching the latest franchise agreements with the distribution utility; to initiate legal measures to request aggregate date on the CCA first, followed by confidential data for billing purposes;
v. Create schedule for requested CCA member city departments to provide any requested databases or analysis of databases to the designated CCA manager;
vi. Authorize creation of a dedicated, secure computer system for the program, and schedule authorization to CCA member municipality telecommunications staff to assist with microgrid design, permit applications, and public presentations;
vii. Authorize CCA manager to license a DER billing system, and create an opt-in account structure for voluntary, active enrollment; and direct the water and/or sewer department or otherwise named agency to provide monthly billing insert to be provided by the agency to the CCA at no cost except electronic transfer to one side of one page of each bill;
viii. Establish schedule for planning departments in member municipalities to collaborate on a build-out permit schedule;
ix. Launch funding: propose a budget and management approach to be taken from among those identified in this report, for example the allocation of funds for one Full-Time Equivalent staff person, dividable between four staff, for the first year, added by another (two staff) to help data, analysis, program preparation, citizen/customer education and opt-out enrollment. Authorize a point person to evaluate and recommend existing employees to devote their divided time to the chief CCA manager, interview and recommend a consultant to the designated CCA municipal government, at public hearings. Formalize a decision-making process and participants. Authorize staff to evaluate and recommend a lead consultant for approval.

b. **General funds** Decide whether to invest general funds in startup costs and/or direct investment on municipal properties to be employed as equity DER share "colonies".
c. **Loan** Decide whether to commit to repay general funds disbursement, as required, within a ten-year time frame.
d. **Inter-municipal agreement** Establish a one year schedule to invite municipal governments to join the process of doing all these things and making all the decisions that the CCA 3.0 has to make.

2. State next steps

a. **CCA association** The only CCA association is in California. While the only model, it is not ideal for 3.0 approach, because it has opposed localization in the past. It is important for the association to be focused on DERs if they are to navigate utility politics effectively. Otherwise they may, like CalCCA, be committed to RECs and nonlocal resources.
b. **Jointly fund lobbying of regulators, legislators, governor** Establish a fund and ask other CCAs to subscribe to the fund. Hire independent staff not from CCAs or member municipalities, and let them run the association, enrolling residents and local business owners, followed by NGOs and activist volunteers, to set the agenda and provide background context for focusing on and coordinating on key campaigns.
c. **Opt in natural gas** Hold hearings on high level initial "yes or no" to include fuel switching of hot water and heat. If no, hold another hearing on the consequences of excluding hot water and heat in terms of impactfulness, then a third to make a final decision. If no, schedule an update with option to proceed in another year.
d. **Remove or invent work-arounds to identified barriers to microgrids** Set up pilot project in municipal buildings, and seek private sector partners to go through the local government and utility permitting processes in parallel.
e. **Identify and apply for available RE and DER funding** CCA board should authorize CCA manager to apply for funding from state governments, foundations, individual donors or fundraising campaign.

L. CCA 4.0: future expansion and integration

In many ways, CCA 3.0 is the final and complete version, to the extent that it successfully shifts to a behind-meter resource strategy and significantly enrolls customers in energy equity sharing and cooperative enterprises.

However, future CCAs will achieve full scaled operational integration of microgrids to allow flexible grid connect and disconnect, creating a new in-building, on-block and perhaps some day city- and CCA-level resilience for energy critical buildings in weather emergencies. CCAs will expand equity participation models to an opt-out basis, creating equity for every customer regardless of customer engagement level. Finally, future CCAs will discover their power to improve a variety of needed services not provided by monopolies or retail market providers:

1. Energy islands Energy islands are CCAs that float on DERs and reduce the grid to a backup service function. A full integration of islands is implementable today, and microgrids, VPPs and DERMS software and hardware specifications should include islanding functionality from day one, with hardware purchase delayed until approval is received, to avoid obsolescence.

2 . Automatic all-in equity Future CCAs will offer a universal opt-out enrollment of aggregate DER equity. Under this approach, the CCA program becomes one giant customer negawatt-hour equity bank, conferring equity to all customers based on monthly bill payments and voluntary sharing and cooperative projects.

3. Community Choice Everything In many ways, CCA is really inventing a new *modus operandi f*or local governments in their relationship to citizens, in which they become active organizers of local solutions and agents of citizen equity. As they are moving beyond traditional electricity plug loads to serve thermal and transportation consumers, CCAs can go beyond this to organize other needed community services and benefits, such as improved health insurance and medical treatment, scaling up Community Supported Agricultural-type programs to organize competitive food markets and public procurement from local organic farms to preserve regional agricultural resources and prevent sprawl. With many of America's Main Streets now long gone in the wake of strip malls and after them, Amazon.com, municipalities will find ways to navigate increasingly centralized, globalized markets in ways that serve local needs better, reduce dependency on imported resources, and support local business participation in those initiatives. Given the deconstructed state of the U.S. domestic economy, the potential list of demand-aggregated projects is quite extensive, from initiatives to replacing disappearing the nation's local newspapers television stations, to technology initiatives stimulating local manufacturing, assembly and value added businesses. Rather than just follow the traditional tax and spend approach to local governance, CCAs can engage with the people as citizens and consumers to help organize local economic cooperation a spirit of mutual self-interest.

Appendix A: case studies and stories

1. East Bay Community Energy, California (https://ebce.org/)

Launched in 2018, one of California's largest CCAs serving all of Alameda County, was initiated by local climate justice activists, and was formed with robust public input, citizen advocacy, volunteer committees assisting with policy and technical research, active participation in selecting consultants for potential studies, and continuing high levels of participation after the launch of services, including criticism of inadequate measures. Because of a fundamental commitment to non-incremental, transformational policy goals that remain consistent with social equity, EBCE has avoided is a typical pattern of deflation among activists, when staff take over.

Guided in part by veterans of the CCA wars in San Francisco over the preceding decade, the EBCE activists anticipated failures and made sure that the CCA formation process stayed on the front-page of local newspapers. They were a major factor in early customer engagement, educating community groups and the public about the very big deal that is EBCE. Today, a formal Citizens Advisory Committee, and strong ongoing activist participation at a variety of governing board, committee and community meetings ensures that ECBE is something of a "permanent campaign." The relationship between pushing the goals of the public and the practical realities that staff encounter have a much healthier balance than elsewhere.

EBCE's CEO, tech-savvy and focused on a disruption model, has the great focus on data and DER integration, focusing resources on analytics, and planning for microgrids and an interest on how to confer equity to customers..

2. Monterey Bay Community Power, California (https://www.mbcommunitypower.org/)

Unlike other most other CCAs in California that have a board of one member per participating municipality (e.g. Sonoma Clean Power's board has over 20 members), MBCP has a Policy Board of elected officials, limited to 15 members with a provision that a city or county with a population of over 50,000 has a permanent seat, while those under 50,000 have to share a representative on a rotating basis. This board sets the rates and the budget. They hire and manage the CEO, and set strategic goals. The board meets four times a year.

A second Operations Board is made up of city managers and county administrators. They report to their home government. They meet once a month and implement the budget and the strategic vision of the Policy Board. This two tier board is seen locally as a success. and was adopted from the model used by the local library system.

In addition, there is a Community Advisory Committee. They are drawn from the local populace based on interest and expertise. They are working on innovation, including pilots for EVs and microgrids.

In terms of chronology, the process of forming MBCP began with the formation of that same Community Advisory Committee that was brought together by staff of local elected bodies and agencies to investigate a "wish list" for CCA and DER innovation. EVs were a first priority, and now microgrids are the central focus, but these are just two items of a long list of goals.

This broad group of individuals has been able to find multiple strategies to develop a successful CCA, including extensive grant funding from state and regional agencies. They have also developed a buying cooperative with Silicon Valley Clean Power, a neighboring CCA.

3. Westchester County, Sustainable Westchester, New York State (https://www.westchesterpower.org/)

The first CCA in New York grew out of a consortium of towns organizing to advance climate and DER goals. CCA became one of those strategies, first as proposed legislation. Once the governor ordered CCA, the state's first adopter turned its focus to enrolling customers, including large Commercial and Industrial (C&I) accounts, and developing DER. One early DER example was a solar array on public land in which customers could become shares owners, as well as including EVs and heat. Westchester County's CCA has successfully offered shares in a solar array on a local landfill, along with support from the New York Green Bank, to improve the financing conditions for that project, with enrollment in that program beginning in 2019. Westchester Power is governed by a board including public officials, local elected officials, and experts in finance and the environment, and run by a nonprofit organization, Westchester Power, "to give Westchester County consumers better energy choices through collective action that create stable future prices, access clean power at more competitive rates, and opportunities for developing local, sustainable energy systems and programs."

4. Athens, Ohio - Southeast Ohio Public Energy Council (https://www.sopec-oh.gov/)

Starting in 2008, local activists engaged Athens' city council and mayor to begin an ongoing community discussion about CCA, starting with televised council/town meetings, framing goals around decarbonization and green power development, and adopting a CCA ordinance after which a council of governments was formed in 2014. Their town hall meetings took a high level approach to how CCA could not only lower rates but localize, become customer-owned, and improve local resilience and economic vitality. Their first contract began in March 2015, followed immediately by their first energy efficiency program (Community Energy Savers) offerings the same year,

including the distribution of 50,000 LED light bulbs and home energy audits throughout the SOPEC communities, which resulted in community savings of more than $5 million in energy bills that year. SOPEC and Athens successfully created a CCA customer rate adder to fund local solar installations on public buildings in 2018. Under the umbrella of the Southeast Ohio Public Energy Council (SOPEC) and with a very small budget (mailers for $0.29 per piece), Athens is actively looking to CCA to be a channel for PACE, state energy efficiency funding, and prospectively, DER and community shares investment. In lieu of a financing authority, SOPEC sponsored a "carbon fee" and though not required to do so put it before voters, who approved it. In so doing SOPEC paved the way for any CCA in Ohio to fund solar and potentially energy efficiency. Today SOPEC is interested in developing DERs in homes and businesses as well.

The mission of SOPEC is "to provide simple, valuable, and reliable public energy programs that help our communities achieve their local energy goals. The primary programs provided by SOPEC are to support Community and Customer Choice through governmental energy aggregation and mercantile customer aggregation, energy efficiency development through financing programs, and renewable energy development through technical assistance programs." In 2015 the Community Energy Savers program was launched within the City of Athens, Athens County, and the Village of Amesville. In 2016 the neighboring City of Logan and the Villages of Somerset, Shawnee, New Straitsville, Chauncey, Trimble, and Buchtel joined the CCA to receive both energy and SOPEC-led local renewable development in their communities.

5. Maplewood, New Jersey (https://sustainableessex.wordpress.com/about/)

A local activist from Maplewood read the state's CCA statute and realized that groups of municipalities could form CCAs, which began the organizing of the CCA there. While Maplewood took the lead on drafting and vetting RFPs, a group of five towns joined to form their CCA. They created a mil adder to their rate to finance energy efficiency - the first to do so - and are in the process of developing their local programs. Member municipality, Montclair, has also used state funds to explore and plan a local microgrid. The investigation of the potential intersection of CCA and new local DER development is ongoing. In March 2018, the Township passed Ordinance # 2899-19, authorizing a Government Energy Aggregation ("GEA") program in Maplewood.

To create even greater purchasing power in the marketplace, the Township also formed the Sustainable Essex Alliance Energy Procurement Cooperative ("SEAEPC") in conjunction with several other Essex County municipalities, with the aim of using joint purchasing to obtain the best possible pricing for renewable energy supply, in furtherance of sustainability goals and the commitment to reduce the Township's carbon footprint. The participating Essex County municipalities, which include Maplewood, Glen Ridge, Montclair, South Orange and Verona, jointly named the program the Sustainable Essex Alliance Renewable Government Energy Aggregation, or 'SEA R-GEA.'

While its REC strategy is a distinctly 1.0 model, the SEARGE is a CCA 3.0 leader as the first to win New Jersey Board of Public Utilities authorization of an operational adder to fund energy efficiency measures in homes and businesses: a first in the U.S. among

hundreds of very green CCAs whose energy efficiency programs are nonexistent. Given the fact that states outside Massachusetts and California, which have established utility-collected non-bypassable fees for energy efficiency which CCAs there are entitled to administer, do not have any funds whatsoever for energy efficiency, SEARGE represents an important model for CCAs to do so autonomously.

6. The Cape Light Compact, Massachusetts (https://www.capelightcompact.org/)

The nation's first CCA led the way in the state of Massachusetts showing, particularly with regard to energy efficiency, what can be accomplished through local control. The fact that the Cape Light Compact is well established means that it has surmounted many obstacles for prospective CCAs already and laid out paths that are easier, not more difficult, to follow because this working example exists. On the Cape, a selectman from Falmouth joined with a Barnstable County commissioner to address high energy costs in the region through a CCA strategy, developing the Barnstable County Energy Management Plan in 1993-94. As part of that plan, reflecting legislation they supported in the state senate in 1994 and 1995 (Senate Bill 447, Montigny-New Bedford), Barnstable County began to look into the idea of coordinating the towns to combine their buying power for the purchase of electricity. CLC's detailed history spans nearly a quarter century, as described on its web site.

In spring of1995, the County obtained US Department of Energy funding for the partnership to study local government options in competitive electric markets. The resulting report found that consumers needed to aggregate to gain the benefits of competitive electric markets; local governments were natural aggregators, providing non-discriminatory access, and established competitive bidding procedures; local governments had franchise powers; and the goals of environmental protection and energy efficiency could be advanced through what were then termed "Consumer Service Districts" in the legislation. In December 1995, the Massachusetts Department of Public Utilities issued an order on retail competition (D.T.E. 95-30) which included the concept of using local government franchises to aggregate consumers. The following year the DPU conducted another round of hearings and formulated rules and draft legislation for retail electric competition. This resulting order (D.T.E. 96-100) included the option for municipalities to aggregate consumers.

Throughout 1996, the County held educational meetings with Boards of Selectmen, town managers, and local finance committees. In February 1997, the County formed the Cape Light Compact planning committee made up of representatives appointed by Cape towns. In November 1997, the Massachusetts Electric Industry Restructuring Act was passed by the legislature and signed into law, including provisions for Community Choice Aggregation, then referred to as Municipal Aggregation.

For the Compact, an Intergovernmental Agreement was drafted through a process of review and comment by county and town legal counsel. The proposed agreement was taken to Boards of Selectmen and Town Meetings. Twelve Cape towns joined in 1997 and the three remaining towns in 1998. In 1998, the six Vineyard towns also voted to join the Compact. Given obvious cost efficiencies and the central role it had played in

developing the concept, Barnstable County was selected to provide a variety of administrative and financial services for the Compact.

The Compact developed detailed plans for its Power Supply Program and Energy Efficiency Program and embarked on consumer protection efforts. The first successful joint action of the Compact was to intervene in a DPU case concerning disbursement of funds from Commonwealth Electric's sale of the Canal Electric Plant. Cambridge Electric and Harvard/MIT were looking to gain the value of all the profits. This type of intervention had not been undertaken by Barnstable County or the towns in the past. The DPU's final decision included $25 million out of a total of $52 million coming back to Cape Cod and Martha's Vineyard consumers.

The Compact's Aggregation Plan was approved by the DPU in 2000, spurring similar municipal aggregation efforts in other states. The new competitive market was volatile in pricing and slow to develop for small retail consumers. As expected, most power suppliers were interested in serving large industrial and commercial customers. However, in March 2000, the Compact reached an agreement with Select Energy, Inc. on a power supply contract to serve all customers. Continuing volatility in the market delayed startup of service, but having the power supply contract in place satisfied a state pre-condition that allowed the Compact to move ahead with an Energy Efficiency Program.

The DPU approved a five-year plan prepared for the Energy Efficiency Program, and services previously provided by Commonwealth Electric (now Eversource) were transferred to the Compact and began operation in July 2001. This was the first time in the nation that a group of municipalities which did not have a municipal electric utility, that also owned the poles and wires, took over an energy efficiency program.

The purpose of the program was to ensure that the $5 million that Cape and Vineyard electric consumers paid into energy efficiency funds on their bills each year, under a state-mandated charge, would be utilized on the Cape and Martha's Vineyard. The program would also eliminate shareholder incentives from being deducted from energy efficiency funds. The elimination of shareholder incentives put the money back into energy efficiency program services. To make a smooth transition, the Compact hired many of the same vendors who served standard utility programs, but it also included a number of innovative local features and was soon recognized as an award-winning effort.

For the first nine years of accomplishments, the Compact states that their program:

1) Conducted more than 15,500 free energy assessments for residential, business and government consumers on the Cape and Vineyard; 2) Saved an estimated 18 megawatts in peak electric generation, offsetting 1.6 percent of the Canal Plant's rated capacity; 3) Saved more than 103,600 megawatt hours of energy use and associated air pollution; 4) Saved consumers more than $20.7 million annually on electric bills.

In 2002-04 the Compact developed a pilot program and negotiated a Power Supply contract for 53,000 default service customers paying higher prices to NSTAR. It resulted in an estimated savings of more than $4.75 million. While this gave a start to

the supply program, the Compact continued to face volatility in power pricing. When a window in the market opened, the Compact shifted its Power Supply contract to ConEdison Solutions, which agreed to serve all 200,000 customers starting in 2004.

Following its goals to encourage the development of renewable energy and gain access to the benefits of wholesale markets, in September 2007, the Cape Light Compact helped to establish the Cape and Vineyard Electric Cooperative (CVEC). Nearly all of the towns on the Cape and Vineyard have joined CVEC as members, and their representative make up the board of directors. The strategy initially pursued was to build local renewable energy supplies to help stabilize and reduce power prices. In 2011, CVEC managed a procurement process for construction of 16 megawatts of solar photovoltaic (PV) capacity in its member towns. In contrast to the wind project, this effort gained broad support. The second round of procurement for additional PV capacity was conducted in 2012. Another 12 megawatts was contracted for development. “At that time municipalities were not allowed to generate renewable energy with enabling legislation,” said Compact Administrator Maggie Downey. "Cooperatives could do renewables -- so we formed CVEC. We are up to 33MW of installed power -- under PPAs with an option for the municipality to buy after a set period. When we had accelerated depreciation and the PTC it was a rich environment for public private partnerships."

The Compact supported CVEC’s start-up with $3.7 million in funding provided over a seven-year period. The return on this investment over a twenty-year period is estimated at $60 million. This is the largest amount of solar being developed by a small group of municipalities anywhere in the United States. Massachusetts officials regard the CVEC PV program as a model for communities in the rest of the state.

In July 2017, the Compact reorganized as a Joint Powers Entity, under the Act Modernizing Municipal Finance and Government, allowing for it to be its own separate legal entity. This protects the members from liability exposure and enhances financial accountability.

In November 2019 CVEC released an RFP for 25 new potential solar PV development sites to be developed. CVEC has installed 33MW of solar PV since its formation in 2007, but this RFP was distinct. Because CVEC has reached or is fast approaching the caps for NEM across its territory covered by two distribution utilities, it asked bidders to look at Behind-the-Meter configurations for these new PV arrays. In addition, it asked bidders to consider on-site storage to maximize the usefulness of the generation. Rather than relying on artificial and changing utility incentives, offsetting distribution, transmission and generation charges will be key to the economics of these new developments.

There will undoubtedly be many challenges ahead in the energy field as markets and technologies and state and federal policies continue to evolve. The Compact member towns and counties have an opportunity to advance the energy sustainability of the Cape and Vineyard through energy efficiency, power supply, and renewable energy programs. The Compact will continue to participate in the development of SmartGrid and microgrid technologies.

Appendix B: Glossary of Terms

8760 -- the electricity usage pattern over every hour in a year.
AMI -- **Advanced Metering Infrastructure** -- sometimes called **Smart Meters** -- meters that facilitate real time collection of customer energy usage for the purpose of analysis and DER integration.
BES-DR -- **Battery Energy Storage Demand Response** -- a program being used by East Bay Community Energy to pay customers with battery storage to discharge that power when the price of electricity rises above a particular threshold.
CCA -- **Community Choice Aggregation** -- the statutory mandate that allows municipalities, solely or in groups, to become the buyer of electricity for customers within its jurisdiction on an opt-out basis. The details and powers of a CCAs statutory authority vary slightly by state.
CEC -- **California Energy Commission** -- a funding and research body similar to DOER and NYSERDA
CPUC -- **California Public Utilities Commission** -- the regulatory agency that governs electric utilities and others in California.
DER -- **Distributed Energy Resources** -- renewable and efficient technologies that provide energy at or near the point of consumption.
DERMS -- **Distributed Energy Resource Management System** -- the software and hardware that allows DERs to be integrated
DOER -- Massachusetts **Department of Energy Resources** -- a state energy research body
DPU -- Massachusetts **Department of Public Utilities** -- the state utility regulator.
DR - **Demand Response** -- the ability to curtail loads and dispatch power in response to specific conditions and needs, enabled by smart technologies like AMI meters and IP thermostats.
DSM -- **Demand Side Management** --the dynamic monitoring and control of customer demand through energy efficiency and demand response technologies.
EE -- **Energy Efficiency**
EIA -- U.S. **Energy Information Administration**
ESCO -- **Energy Services Company** -- an energy services company, in many states the third party suppliers of electricity to CCAs
FERC -- **Federal Energy Regulatory Commission**
FiT -- **Feed-in-Tariff** -- a fixed price by kWh paid for all the power produced by a renewable energy installation.
GW – **Gigawatts**
iDER – **Integrated Distributed Energy Resources** are interoperable DERs that combine onsite renewable generation with storage controls, HVAC/hot water appliance controls, EV charger controls, and other controls to optimize performance of DERs and facilitate onsite disposition of resources.
IoT -- **Internet of things**
IP -- **Internet Protocol** -- a technology that can communicate with and be controlled remotely via the internet.
ISO -- **Independent System Operator** -- regional electricity market clearing entities. They are non-profit organizations that facilitate bulk electricity transactions, among other related activities. California is served by CAISO, New England by ISO-NE, or frequently "NEISO"
ITC -- **Investment Tax Credit** -- The ITC is a corporate tax credit, equal in the case of PV projects to 30& of the expenditures of a given project.

kWh -- **Kilowatt hour** -- 1000 watts; the unit that is used to price the sale of electricity.
Load Duration Curve -- 8,760 hour per year demand pattern, in this case defined by eligible accounts in a CCA service territory, and differentiated by commercial and residential sources, representing actual recorded load and billed purchased energy, and representable in a 365 leaf fluctuating sine curve.
MW – **Megawatt**, or 1000 Kilowatts of electricity.
Microgrid -- the integration of DERs to provide on-site as opposed to remotely sourced electricity.
Negawatt/Negawatt Hour -- A negawatt hour is the assignment of monetary value to reductions in the use of electricity, a theoretical unit of power representing an amount of energy saved. The energy saved is a direct result of energy conservation or increased efficiency.
NEM -- **Net Energy Metering** -- a tariff that pays a set rate for the generation of electricity from a renewable source while providing electricity to a meter at all times. Production and consumption are netting against each other.
OBF -- On-bill Financing/repayment -- the ability to finance DER, traditionally EE, measures over a period of time, often years, embedded within the bill or rate that a customer pays on a monthly basis for electricity, heating fuel or water -- a way of minimizing or eliminating upfront costs to adopters.
Opt-in -- Every customer offered CCA service is automatically enrolled on an opt-out basis, meaning if they do not elect to remain with the distribution utility's Basic Service or another supply, they will be enrolled in the CCA, at which point they opt-in. Customers can also opt-in to other products.
Opt-up -- Under the CCA 3.0 program design, customers may volunteer to pay a premium to receive shares, ideally through a municipal loan agreement and billing, or else through a CCA-administered Transactive Energy Platform, using municipal bonds or other public funding, local banks, or commercial project finance for the customer. Thus, customers opt-up to equity.
Opt-with -- The CCA 3.0 program will administer a similar service to active customer DER cooperatives, which would be opting-with one's neighbors.
PACE -- **Property Assessed Clean Energy** -- the use of a lien on private property, business or residence, to finance DER.
PCIA -- **Power Charge Indifference Adjustment** -- a charge assessed by California investor-owned utilities to cover generation costs acquired prior to a customer's change in service provider - an "exit fee" assessed to customers which receive their generation services from another provider.
PGC -- **Public Goods Charge** -- a fee assessed on customer bills to fund DER, most commonly energy efficiency programs and initiatives. It exists under many different names.
PPA -- **Power Purchase Agreement** -- a popular contractual mechanism to finance renewable energy installations by setting a price for the energy generated and a duration of years over which the buyer will agree to pay it.
RE -- Renewable Energy
REC -- **Renewable Energy Credit** -- a virtual attribute of renewable energy sold to encourage investment in renewables.
RFP -- **Request for Proposals**
SaaS -- **Software as a Service** -- SaaS is a commercially licensed or contracted cloud-based platform to provide DER back-office services, including reporting, customer care, online billing and payment, and utility electronic data interface (EDI) communications.
SCADA -- **Supervisory Control and Data Acquisitio**n

SREC -- **Solar Renewable Energy Certificates** -- a solar incentive that allows homeowners to sell certificates for energy to their utility. Many renewable portfolio standards have a solar carve-out requiring that a minimum percentage of electricity sales in that state come specifically from solar power, and SRECs are used as tradable RPS compliance credits. For every megawatt hour (MWh) of electricity that a solar energy system produces, a corresponding SREC is created. A homeowner earns one SREC for every 1000 kilowatt hours (kWhs) produced by their solar panel system. An SREC can be worth over $300 in certain states.
SMART -- **Solar Massachusetts Renewable Target** --The SMART incentive, which replaced SREC II in 2017, is set through an auction, in which residential programs will receive 2 times (or 2.3 times, for low-income households) the incentive established by an auction to large commercial project developers, who bid the *lowest* incentive amount rather than the cost of building project, and the lowest bid wins. This incentive is low compared to the previous SREC SREC-II program, under which the average customer received $0.25 per kWh above the net metering benefit 2016.So the SMART solar incentive is worth less than half the value of SREC II.
TOU Metering -- **Time of Use Metering** -- a method of measuring and charging a utility customer's energy consumption based on when the energy is used. Utility companies charge more during the time of day when electricity use is higher. TOU rates vary by region and utility.
Transactive Energy Platform -- transactive energy systems are comprised of coordinated participants that use a system of economic and control mechanisms that allows the dynamic balance of supply and demand across the entire electrical infrastructure using value as a key operational parameter. Regulations vary by state.
V2B -- **Vehicle-to-building**
V2G -- **Vehicle-to-grid**
VNEM -- **Virtual Net Energy Metering** -- the ability of customers with meters not directly linked to a renewable energy installation to participate in a NEM arrangement.
VPP -- **Virtual Power Plant** -- the configuration of DER resources such that they are able to provide electricity as a simple fossil fuel plant would have in the past.

3. Community Electricity Programs in Massachusetts

By Peregrine Energy Group

A. Introduction and Framework

Many Massachusetts municipalities are using, or are considering, a Community Electricity Program (CEP) as a tool for reducing greenhouse gas (GHG) emissions. Through CEPs, municipalities have implemented a variety of GHG-reducing initiatives, including purchasing Renewable Energy Certificates (RECs), contracting with renewable energy generators, deploying distributed energy resources, and implementing energy efficiency programs.

These programs are commonly referred to as Community Choice Aggregation, or "CCA." However, the term CCA is often used to refer to both the program and to the entity (a single municipality or group of municipalities) that is sponsoring the program. CCA entities often sponsor multiple initiatives, which can create confusion about whether "CCA" refers to the electricity program or to some other initiatives sponsored by the same entity. Because this paper is being published with another paper that is focused on the CCA entity, this paper uses the term "CEP" to refer to the program.

This paper is focused on what can be done through the CEP program – the core function of providing retail energy supply and related initiatives funded through CEP charges to customers. The paper does not address other initiatives that a community, or CCA entity, could implement using other tools at its disposal.

Using Massachusetts as the focus, the paper will discuss the opportunities and challenges for using CEP as a GHG reduction tool. The paper will look at structural and market issues and also discuss a range of specific CEP initiatives, including both initiatives currently being implemented in Massachusetts and potential additional initiatives. The objective of this paper is to provide information that will be useful to municipalities in selecting CEP strategies to meet their goals.

As background, CEP is a form of group purchasing in which a municipality (or group of municipalities) arranges retail energy supply for residents and businesses in the community(ies). CEP has been allowed under Massachusetts state law since 1998. Currently, there are over 150 cities and towns in the state with active aggregations, including large cities such as Worcester, Cambridge, Newton, and Lowell, and small towns such as Sutton, Carlisle, and Williamsburg.

The paper is focused on opportunities for CEPs in Massachusetts, which means opportunities given that state's CEP enabling statute and electricity market structure. Because of statutory and market differences between states, it is likely that there are

approaches that are possible in Massachusetts that would not be possible elsewhere, and approaches that would be possible in other states but not in Massachusetts.

While the paper will discuss a number of potential initiatives, we will avoid using the term "3.0" to characterize some of them so as not to imply that the selection of one initiative over another is a matter of evolution rather than choice. Whether any particular initiative is right for any community depends on that community's goals and strategies.

In choosing among potential CEP approaches, it can be helpful for a community to distinguish among goals, strategies, and initiatives. For this purpose:

- Goals are broad targets, big outcomes. They are "what" the organization is trying to achieve.
- Strategies are things an organization does to achieve its goal. These are the "how."
- Initiatives are more specific activities undertaken to implement a strategy. Like strategies, initiatives are about "how," but at a finer level of detail.

These categories are illustrated in the table below.

Example CEP Goals, Strategies, and Initiatives

Goal	Strategy	Initiative
Reduce GHG emissions	Increase renewable energy generation in New England	Purchase additional MA Class I RECs
Reduce GHG emissions	Increase renewable energy generation in the community	Invest in local renewable energy projects
Reduce GHG emissions	Reduce electricity use in the community	Pay incentives for energy efficiency projects
Reduce GHG emissions	Switch from oil and natural gas to electricity	Pay incentives for switching to electricity
Reduce GHG emissions	Reduce electricity use in the hours when the electricity grid is the dirtiest	Notify customers of the highest GHG hours, and encourage them to reduce use at those times

The items are not mutually exclusive. It is possible for a community to pursue multiple goals, or multiple strategies in support of a single goal, or multiple initiatives in support of a single strategy.

The selection of the correct initiative(s) is dependent on a recognition of the community's goals and the strategies it has selected to pursue those goals. Any particular initiative might be right for one community because it lines up with that community's strategies and goals, but wrong for another community that has different strategies and goals.

B. Massachusetts structure

1. Legal structure

CEP in Massachusetts is authorized by Section 134 of Chapter 164 of the General Laws. Section 134 (a) provides that:

> Any municipality or any group of municipalities acting together within the commonwealth is hereby authorized to aggregate the electrical load of interested electricity consumers within its boundaries; . . . Such municipality or group of municipalities may group retail electricity customers to solicit bids, broker, and contract for electric power and energy services for such customers.

A municipality wishing to start a CEP must obtain an authorizing vote from the town meeting or city council. Then, it must develop an aggregation plan, which must be reviewed by the citizens of the community and the state Department of Energy Resources and then be approved by the state Department of Public Utilities (DPU).

The statute provides that CEP is "opt out," meaning that eligible customers automatically become part of the CEP unless they affirmatively choose not to. The CEP must inform customers of their opt out rights prior to enrollment. The statute requires that the CEP allow customers to opt out without penalty any time within 180 days of being enrolled. In practice, all Massachusetts CEPs allow customers to opt out at any time without penalty.

Opt-out enrollment applies only to customers on utility Basic Service, not to customers served by competitive retail suppliers. In most Massachusetts communities, approximately 85% of customers are on Basic Service. Typically, 5% to 10% of those customers opt out of the CEP at the time of program launch. As a result, most Massachusetts CEP are serving about 75% of customers in the community.

The Massachusetts DPU has provided a more detailed structure for CEPs through a series of orders approving aggregation plans. Among other issues, the DPU has focused on the clarity and comprehensiveness of the notices provided to CEP customers. In particular, the DPU has called out unsubstantiated claims of future savings by some CEPs, and required that CEP inform customers that savings cannot be guaranteed.[41]

[41] *Town of Avon*, D.P.U. 17-182, at 15 – 16 (2018); *City of Melrose*, D.P.U. 18-59, at 14 - 15 (2019).

While the DPU carefully reviews CEPs' notices to customers, the DPU does not regulate the power supply prices that CEPs charge.[42] The DPU does, of course, regulate utility distribution rates. However, CEP prices are fundamentally different because customers can choose whether to participate in a CEP or not. Since distribution services are monopoly services (the customer has no choice in their provider), rate regulation is necessary. But rate regulation is not needed for competitive services such as those provided by CEPs. If a customer does not like the prices a CEP is charging, the customer can simply switch to Basic Service or a competitive supplier.

Section (b)[43] of the CEP statute enables aggregations to go beyond providing retail electricity supply and to take control of the energy efficiency funds collected through distribution rates. These are the funds used by utility distribution companies to administer energy efficiency programs. With authorization, the CEP can take the place of the utility and become the administrator of the efficiency programs offered in their community.

In addition to the energy efficiency funds, Section (b) also authorizes CEPs to take control of the renewable energy funds that are collected through distribution rates. These funds are administered by the Massachusetts Clean Energy Center, a state agency. The process for obtaining the renewable energy funds is similar to the process for obtaining the energy efficiency funds. The amount of money available is much smaller -- about 5% of the energy efficiency funding. No CEPs have sought control of the renewable energy funds.

2. Market structure

In Massachusetts, CEPs operate within a competitive retail electric market. The market is divided into two pieces: delivery and supply.

Delivery services are provided by the utilities on a monopoly basis. Delivery services include distribution, transmission, and metering.

Supply services include the electricity itself. These services are competitive. Customers can choose to receive supply from either a competitive retail supplier, utility Basic Service, or the CEP. Many retail suppliers market very aggressively, and compete on price and in some cases on environmental content. Utility Basic Service prices are

[42] As discussed in more detail below, CEPs can charge an "operational adder", which is a small fee that is included in the price paid by customers and that goes to the municipality to cover the operational costs of the program. While the DPU does not regulate the underlying power supply price, they do review both the level and proposed uses of an operational adder to ensure that there is a "sufficient nexus" between the uses of the adder funds and the program. *Town of Becket, et al.*, D.P.U. 18-133 through 18-146, at 28 – 29 (2020).

[43] M.G.L. C. 164, § 134(b).

established through biannual auctions and as a result are closely aligned with market prices. Basic Service prices are the benchmark against which CEP prices are compared.

3. CEP participants

CEPs in Massachusetts work with Utility Distribution Companies, Aggregation Consultants/Brokers/Attorneys, and Competitive Retail Suppliers. The primary roles of each are as follows:

Utility Distribution Companies
- Provide delivery service
- Meter electricity use
- Bill customers and collect payments

Aggregation Consultants/Brokers/Attorneys[44]
- Develop the aggregation plan
- Secure regulatory approvals
- Manage a competitive procurement to select a competitive retail supplier
- Conduct customer education
- Oversee supplier performance

Competitive Retail Suppliers
- Supply electricity and satisfy all ISO New England requirements
- In partnership with the Utility Distribution Company, process customer enrollments, opt ups, and opt outs
- Send the opt-out notice and manage opt-out replies

A key difference between the Massachusetts CEP model and the California model is the role of the Competitive Retail Supplier. Given that California does not have a competitive retail market for small customers, the CEP itself performs the retail supply functions. Massachusetts, on the other hand, does have a retail supply market for all customer classes. In all Massachusetts CEPs to date, the CEP has engaged a competitive retail supplier to provide the retail supply functions. These firms are licensed by the DPU, qualified to operate in the New England wholesale power markets, and have significant financial resources and technical expertise.

[44] For all but one Massachusetts CEP, these services are provided by a combined team on a turnkey basis. However, it is possible for a municipality to engage separate professionals. One Massachusetts CEP, the Cape Light Compact, performs the consultant/broker/attorney functions using a combination of in-house staff, specialized consultants, and an outside law firm.

C. Strengths and challenges for Massachusetts CEPs

1. Strengths

Opt-out enrollment

CEP's greatest strength is the opt-out enrollment mechanism. All customers on utility Basic Service automatically become part of the CEP unless they opt-out. As a result of this mechanism, CEPs typically serve over 75% of the customers in the municipality, well more than utility Basic Service and competitive suppliers combined.

Association with municipality

As municipal programs, CEPs benefit from the trust that customers have for their municipal governments. CEPs operate to serve a public purpose, in contrast to the profit-making motive of competitive suppliers.

An easy experience for customers

Under the Massachusetts retail market structure, very little changes for customers joining an aggregation (or contracting independently with a competitive retail supplier). Customers continue to receive a single bill from the utility, and continue to remain eligible for low income discounts, net metering, and utility-funded energy efficiency programs.

A big lever for GHG reduction

Municipalities that are trying to achieve climate goals often struggle to make a significant impact. Programs that require individual customers to take action – e.g., for energy efficiency or installation of distributed generation – are hard and slow. The achievement of even a few percent per year is a challenge. By contrast, through CEP a municipality can achieve significant GHG reductions practically with the stroke of a pen. CEP is a big lever for GHG reduction.

2. Challenges

Customers can leave any time

While customers become part of a CEP on an opt out basis, they are free to leave at any time. In Massachusetts, this is not a requirement, but all CEPs offer it.[45] From the customer perspective, the right to leave balances the automatic enrollment feature.

[45] The aggregation statute requires only that customers be allowed to opt out without penalty within 180 days of being enrolled. M.G.L. c. 164, §134(a).

Some customers react negatively to the automatic enrollment, but their concerns are eased when they learn that they can opt out at any time.

Because customers are free to leave any time, CEPs tend to be mindful of other offers in the market and work to keep their prices in general alignment with those other market offers. If a CEP's price goes well above market, the CEP risks losing significant numbers of customers and losing the support of municipal officials.

CEPs often offer three products:

- **Standard Green** (the automatic enrollment product), with more renewable energy than Basic Service but a price at or below the expected average Basic Service price
- **Premium Green** (optional), with more renewable energy and at a higher price than Standard Green
- **Basic** (optional), with the only the minimum amount of renewable energy required by law and a price below Standard Green

Market-based Basic Service prices

The Basic Service price is the benchmark to which customers compare other prices, both CEP prices and competitive supplier offers.

Basic Service is designed to reflect market prices. The utilities purchase Basic Service twice per year for residential and small commercial customers and four times per year for large customers. The Basic Service prices reflect market conditions at the time of those procurements. Basic Service prices tend to be volatile, typically swinging 25% or more from one 6-month period to the next.

Because the benchmark price is tied to short-term market conditions, it is a challenge for CEPs to purchase energy supply under long-term contracts because the price under those contracts can become out of alignment with market prices. It is true that long-term, fixed price contracts can provide price stability, which is a benefit compared to the volatility of Basic Service prices. However, there is a limit to what customers will pay for price stability. If the CEP price is stable but higher, at some point customers will switch to the less stable but less expensive basic service prices.

The experience of Massachusetts aggregations has been that:

- There is not significant customer migration when CEP prices are moderately higher than Basic Service for a short period
- There is greater customer migration when CEP prices are significantly higher than Basic Service

- CEPs that launch with prices that are higher than Basic Service have a higher opt out rate than CEPs that launch with prices that are lower than Basic Service

The Cape Light Compact uses a procurement approach that enables it to sign longer-term supply contracts while keeping aggregation prices in line with Basic Service. Other aggregations tend to sign fixed-price supply contracts in which the aggregation locks in a price that does not change for the term of the contract, typically two or three years. The Compact has entered contracts with longer terms, but where the price is not fixed. Instead, the price is adjusted twice per year at the times that Basic Service prices change. The advantage of this approach is that the Compact's price is always roughly in line with Basic Service prices. The disadvantages are that the Compact's price is just as volatile as Basic Service prices.

Competition from competitive retail suppliers

In addition to utility Basic Service, CEPs in Massachusetts also compete with competitive retail suppliers. Many of these suppliers market very aggressively, using direct mail, telephone, and door-to-door. CEPs need to be mindful that customers have many choices in the marketplace, not just Basic Service but competitive supply offers as well.

Some have asked whether municipalities can limit competitive supplier marketing in their communities. Municipalities have tried to address *deceptive* marketing by those suppliers, for example by warning residents and reporting supplier misconduct to the DPU. However, communities have not typically attempted to discourage legitimate supplier marketing, reasoning that citizens benefit from having multiple offers to choose from, even if the result is to reduce participation in the CEP.

Funding policy initiatives through a market-based service

Stepping back, perhaps the key challenge for CEPs comes from seeking to fund policy initiatives through a service that competes in the competitive market.

Policy initiatives are not free, whether they take the form of purchases from renewable generators, special pricing for low-income customers, or other mechanisms. In order to fund these initiatives, the CEP must charge more than it would otherwise.

Funding energy policy initiatives through a competitive service is very unusual in Massachusetts. Instead, policy initiatives are typically funded through charges that customers cannot avoid, either distribution rates or through requirements that apply equally to all suppliers. Even policy initiatives that appear to be part of the competitive market are in fact funded through non-bypassable charges. For example:

- **Low-income discounts:** The energy bill discounts for low-income customers apply to both distribution charges and supply charges. However, the discounts are funded entirely through utility distribution rates. Even where the customer has a competitive supplier, the utility absorbs the full cost of the discount using distribution funds.

- **Long-term contracts for renewable energy:** As required by a new state law,[46] Massachusetts utilities recently entered into very large, long-term contracts with hydroelectric and offshore wind generators. Even though the utilities are purchasing energy, the contracts are funded through distribution rates. The utilities will sell the energy into the wholesale market, and collect any net loss (the difference between the purchase price under the contract and the sale price) through distribution rates.

- **Net metering:** Net metering payments to customers with distributed energy generators are funded through distribution rates.

- **Energy efficiency programs:** The costs of the energy efficiency programs are collected through distribution rates.

- **Renewable Portfolio Standard (RPS):** The RPS is structured differently from the other examples, but the effect is similar. The RPS requires all retail electricity suppliers (including competitive retails suppliers, utility Basic Service, and CEPs) to include a minimum percentage of Renewable Energy Certificates (RECs) in the electricity they supply to customers. The cost of those RECs is reflected in supply charges, not distribution charges. However, since all suppliers must comply with the RPS, there is no way for customers to avoid those compliance costs by choosing one supplier over another.

CEPs, on the other hand, seek to fund policy initiatives through charges that customers can avoid. As discussed above, CEPs compete in the competitive retail supply market. Customers can choose whether to be part of the CEP or to go with a competitive supplier or Basic Service. CEPs do have advantages over those other offerings, particularly automatic enrollment. However, CEPs' competitors are not without strengths of their own. Basic Service is a very lean, low-overhead product. And, many competitive suppliers are large, highly-skilled companies with the scale and expertise to offer valuable products to customers. CEPs' advantages give them some room to fund policy initiatives while still offering a competitive product, but that room is not infinite.

Metering

Another limitation in the Massachusetts market is the absence of interval metering for residential and small commercial customers. Unlike California, where interval metering is ubiquitous, in Massachusetts interval metering is primarily limited to the largest

[46] *An Act to Promote Energy Diversity*, Chapter 188 of the Acts of 2016.

customers. Nearly all residential and small customers are metered and billed based on total monthly kilowatt-hours, without regard to when those kilowatt-hours are consumed.

This metering limitation has important implications for CEPs. First, it prevents CEPs from offering time-based rates and other strategies that encourage customers to shift energy use to low cost periods by giving the customer a benefit (a lower price) when they do so.

Second, the metering limitation affects the ability of the CEP to achieve savings by managing its customers' load. The CEP (or its retail supplier) is responsible for delivering into the wholesale market the total amount of electricity their customers use in each hour. Since the price of electricity varies over the course of the day, the CEP should be able to reduce its costs by encouraging customers to shift energy use from high-priced hours to low-priced hours.

This works for customers with interval metering. For those customers, the supplier is responsible for the customer's actual energy use, hour by hour. If a customer shifts electricity use from high-cost periods to low-cost periods, the supplier's cost of serving that customer goes down.

However, if the customer does not have interval metering, the customer's hourly use is calculated using a statistical load profile – a standard use pattern for customers of their size and type.[47] This means that the customer's actual hourly pattern of use does not matter. The supplier is responsible for the customer's use as determined by the statistical load profile, regardless of when the customer actually uses electricity. As a result, with the current metering limitations, a CEP does not reduce its costs when small customers shift use from high price periods to low price periods.

While there would certainly be benefits from a widescale deployment of interval meters, Massachusetts is not on a path to implement such a deployment any time soon. In 2014, the DPU embraced advanced metering, and ordered the utilities to develop 10-year plans to modernize the electric grid.[48] However, in 2018 the DPU changed course, concluding that the likely benefits of advanced meters were unlikely to outweigh the costs at this time, and stated that it would not authorize the utilities to invest in advanced meters.[49]

In the absence of a widescale deployment, individual customers can pay to have an advanced meter installed at their home or business. However, the costs are much

[47] These statistical load profiles apply to the entire utility service territory. They are not specific to the CEP.

[48] *Modernization of the Electric Grid*, D.P.U. 12-76-B (June 12, 2014).

[49] *Petitions for Approval of Grid Modernization Plans*, D.P.U. 15-120, 15-121, 15-122 (May 10, 2018).

higher when meters are installed one at a time.[50] There have been very few residential advanced meter installations under this system.

No supplier-consolidated billing

The Massachusetts rules for electricity billing create a barrier for CEPs. Massachusetts does not allow supplier consolidated billing, under which an energy supplier can provide an integrated bill including both supply and delivery charges. Instead, the only billing options are either a) utility consolidated billing, under which the utility bills for both delivery and supply; or b) separate bills, under which the customer receives two bills, one from the utility and one from the supplier.[51]

Competitive retail suppliers have argued that supplier-consolidated billing is a key to enabling integrated services, e.g., where a supplier provides a package of energy and energy efficiency services designed to reduce the customer's total bill even if the energy price goes up. The combined bill is needed to show the customers the net benefit. In theory, this could be done with utility consolidated billing even if there is no supplier consolidated billing. However, it is not possible in practice because the utility bills do not allow for suppliers to bill for efficiency services. Perhaps because of these billing limitations, Massachusetts has seen very little innovation in the packaging of energy and energy services. This billing limitation creates a barrier for CEPs seeking to provide integrated services.

Electricity CEP only

Currently, Massachusetts allows CEPs for only electricity and not for natural gas. This limitation makes it much more difficult for CEPs to offer comprehensive solutions to customers' energy needs.

D. Funding green initiatives

Massachusetts CEPs are implementing a variety of green initiatives, including incorporating additional Renewable Energy Certificates (RECs) into the power supply and funding the development of local renewable energy generators. The initiatives themselves are discussed in the next section. This section focuses on the mechanisms for funding green initiatives. For discussion, funding sources can be divided into two

[50] Under National Grid's advanced metering tariff, the company will install an advanced meter for a cost of $272.25 for residential customers. If the customer wishes to provide their own meter, National Grid will charge $171.38 to provide a pulse interface device to which the customer could connect their own meter. Massachusetts Electric Company and Nantucket Electric Company, *Optional Enhanced Metering Service*, M.D.P.U. 1318 (October 1, 2016).

[51] *Rules Governing the Restructuring of the Electric Industry*, 220 CMR 11.04(10)(c). See also, NSTAR Electric Company, *Eastern Massachusetts, Terms and Conditions – Competitive Suppliers and Competitive REA Suppliers*, M.D.P.U. No. 4, §8.

categories: payments for services provided by the CEP and external sources, such as funds collected through utility distribution rates.

1. Payments for services provided by the CEP

The primary revenue source for CEPs is customer payments for services provided by the CEP, primarily the supply of electricity.

a. Creating a margin for green initiatives

While CEPs might be primarily motivated by greenhouse gas reduction, the great bulk of the funds they collect from customers goes towards the cost of providing standard electricity. If, for example, the price of Basic Service (which contains no extra renewables) is 10 ¢/kWh, it will cost the CEP close to 10 ¢/kWh to provide electricity with the same environmental profile as Basic Service. In order to provide greener electricity, the CEP must find the funds to pay for it. CEPs can consider a variety of mechanisms.

Savings in the electricity procurement

CEPs have had success in obtaining an electricity supply at slightly below the cost of Basic Service, creating savings that can be used to fund green initiatives. Of course, the price of Basic Service changes every six months, and so it is never possible to guarantee future savings. But, over the last several years many Massachusetts CEPs have been able to obtain a price for electricity supply that is low enough to enable them to fund green initiatives and still keep the total cost of electricity below the cost of Basic Service. CEPs that have achieve this result include the Cities of Cambridge, Newton, and Salem and the Towns of Acton, Lexington, Natick, and Swampscott.

Choosing to charge a higher price

In contrast to using electricity price savings to fund green initiatives, a CEP could simply choose to charge a price that is higher than Basic Service. To give an example, if the Basic Service price were 10 ¢/kWh, and the CEP's cost for standard electricity were also 10 ¢/kWh, a CEP could charge customers 11 ¢/kWh and use that extra 1 ¢ to fund green initiatives. An obvious risk associated with this strategy is that the higher prices could discourage participation in the CEP.[52] However, some communities are considering this strategy as they look for ways to meet municipal climate goals.

This strategy is different from the common practice of offering a flat CEP price in comparison to a variable Basic Service price. Basic Service prices change every six months and are typically 30% higher in winter than in summer. It is common for a

[52] In Massachusetts, there is insufficient experience with this strategy to be able to quantify the impact on participation.

CEP's flat price to be lower than Basic Service in the winter, higher in the summer, and lower on average. That is a different strategy from one of charging a CEP price that is expected to be higher than the average Basic Service price.

b. Operational Adders

Massachusetts allows CEPs to include a charge that provides funds to the municipality. The charge is known as the operational adder.

Both the level and the uses of any adders must be approved by the Department of Public Utilities as part of the aggregation plan.[53] The DPU requires the municipality to demonstrate that there is a "sufficient nexus [between] the proposed use of the funds to be collected through the adder and the operation of the Program."[54]

To date, the DPU has approved operational adders to be used for: personnel costs for an energy manager position; purchases of RECs; and other forms of support for local renewable energy projects. With regard to an energy manager, the DPU has stated that the adder can be used to fund the position only insofar as the energy manager's work is related to the CEP.[55] The DPU has not provided further detail regarding permissible and impermissible uses of an adder. However, this is an evolving area of regulation.

A municipality's use of an operational adder is also restricted by Massachusetts tax law. An adder is a program fee, not a tax, and can be spent only for the approved uses for such a fee. The Massachusetts Supreme Judicial Court has established three criteria for program fees.[56] Those fees must be:

a. "charged in exchange for a particular governmental service which benefits the party paying the fee in a manner 'not shared by other members of society.'''
b. "collected not to raise revenues but to compensate the governmental entity providing the services for its expenses."
c. "paid by choice, in that the party paying the fee has the option of not utilizing the governmental service and thereby avoiding the charge."

The majority of Massachusetts CEPs currently collecting adders are using them to fund energy managers. However, two CEPs, Cambridge and Nantucket, are using adders to fund commitments to renewable energy projects.

[53] Typically, the aggregation plan itself sets the maximum adder charge (in ¢/kWh) and describes the uses of the adder at a high level. Additional detail about the uses of the adder is provided in response to information requests issued by the DPU.

[54] *Town of Becket, et al.*, D.P.U. 18-133 through 18-146, at 28 – 29 (2020).

[55] *City of Lowell*, D.P.U. 14-100, at 14 – 15 (2015).

[56] *Emerson College v. City of Boston*, 391 Mass. 415 (1984).

c. Optional products and services

In addition to its standard offering which customers participate in on an opt-out basis, CEP can offer voluntary services which customers participate in only if they choose to do so. Insofar as these are green options, this is another way for CEPs to fund green initiatives.

Currently in Massachusetts, it is quite common for CEPs to offer optional products with a higher percentage of renewable energy content that the CEP's standard product. Many CEPs offer an optional product that is 100% renewable.

To date, the participation rate in these optional products has been modest, well below 5% in most cases. However, many communities are increasing their marketing of the options, and participation rates are increasing as that marketing expands.

Also, there is a great deal of room for innovation in the types of options offered. This may be a very promising area for CEPs looking to advance new types of initiatives.

2. External funding sources

In addition to revenue from payments for services provided by the CEP, Massachusetts laws allows CEPs to gain access to two sets of funds collected through utility distribution rates: funds for energy efficiency and renewable energy initiatives.

a. Energy efficiency programs

Massachusetts operates one of the largest ratepayer funded energy efficiency programs in the country. Total annual spending between the electric and gas utilities is over $900 million dollars. The success of these programs has been the primary factor causing Massachusetts to be named the most energy efficient state in the nation for nine years in a row.[57]

The funding for these program is collected by utility distribution companies through distribution rates, and for the most part the utility distribution companies administer the programs. However, the Massachusetts CEP law enables CEPs to receive the energy efficiency charges paid by customers within the CEP's territory and to administer the associated programs. CEPs must receive approval from the DPU in order to administer the efficiency programs. To date, only one Massachusetts CEP, the Cape Light Compact, has obtained approval and is administering the efficiency programs.

[57] https://aceee.org/state-policy/scorecard

The energy efficiency funds can be a very large revenue source for CEPs. The customer payments are nearly 2 ¢/kWh for residential customers and approximately 1 ¢/kWh for non-residential customers. Significantly, if a CEP receives approval to operate the efficiency programs, the CEP receives the efficiency funds paid by ***all*** customers within the CEP's geographic territory, including customers that are not participating in the CEP.

b. Renewable energy programs

Massachusetts utility customers also pay a much smaller charge in distribution rates that is dedicated to renewable energy initiatives. These funds are administered by a quasi-public agency: the Massachusetts Clean Energy Center (MassCEC). According to its website,[58]

> MassCEC funds more than 40 programs including incentives for clean energy technology installations, financing for early stage companies and technology development as well as investments in training programs to build a clean energy workforce. MassCEC . . . drives innovation by serving as a clearinghouse and support center for the clean energy technology sector, providing assistance to enable companies to access capital and other vital growth resources.

CEPs can also gain access to the renewable energy charges paid by customers within the CEP's boundaries. As with the energy efficiency programs, DPU approval is required.

[58] www.masscec.com/about-masscec.

3. Funding comparison

We calculated likely funding amounts for several of the potential sources for a CEP approximately the combined size of Northampton, Amherst, and Pelham, Massachusetts. [59]

Funding Source	Annual $	Notes
Utility energy efficiency funds	4,700,000	At current levels collected in utility rates
Operational adder	360,000	At $0.002 per kWh
State renewable energy funds	190,000	At current rates set by statute

4. Other approaches: Seeking savings by bringing functions in-house

Some have raised the possibility of reducing costs by changing the way of staffing CEP functions. In Massachusetts, all CEPs but one engage an outside firm to provide consulting, energy brokerage, and legal services on a turnkey basis, and all CEPs engage a retail supplier to perform the retail supply functions. As an alternative, it has been suggested that CEPs could perform these functions using a combination of in-house staff and consultants, and that doing so would produce significant savings. It would certainly be possible for a CEP to bring some functions in-house. However, doing so is unlikely to generate significant savings for Massachusetts CEPs.

The two main categories of services – consulting/brokerage/legal and retail supply – are discussed separately below.

Consulting/Brokerage/Legal

The functions in this category include:

Legal

- Drafting aggregation plan and securing approval from the Department of Public Utilities (DPU)
- Complying with annual DPU reporting requirements
- Monitoring DPU orders to ensure compliance with the DPU's evolving requirements
- Negotiating the electricity supply contract

[59] The estimates were calculated as follows: All calculations start with total annual kWh use for the 3 communities per MassSaveData.com. Then, for Utility Energy Efficiency funds, kWh use for each community was multiplied by the energy efficiency charges in utility rates for National Grid (Northampton) and Western Massachusetts Electric (Amherst and Pelham). For an Operational Adder, total annual kWh use was multiplied by estimates of the percentage of use that would be served by the aggregation and then by 0.2 ¢/kWh. For renewable energy funds, total annual use was multiplied by 0.05 ¢/kWh, the statutory renewable energy charge.

Energy brokerage

- Evaluating potential competitive suppliers
- Conducting a competitive procurement to select an electricity supplier, including soliciting and evaluating bids
- Monitoring the electricity market and advising on the timing of the procurement, length of contract, etc.
- Supporting the municipality in any disputes with the supplier

Consulting / public education

- Designing and printing public education materials
- Conducting public education sessions
- Designing, building, and managing program website
- Maintaining a customer call center
- Monitoring competitive supplier performance, including customer enrollments and the initial and ongoing opt out mailings

It is possible for a CEP to staff these functions using either a CEP specialty firm or using a combination of in-house staff and outside contractors. While all Massachusetts CEPs but one use a specialty firm, the state's largest CEP, the Cape Light Compact, does not. Instead, the Compact staffs the functions with a combination of contractors, in-house staff, and an outside law firm.

However, while the work can be accomplished using either model, it is not likely that a CEP would achieve significant cost savings from using the in-house model. Among other reasons, the standard fee for an aggregation specialty firm is just one mil (one tenth of one cent) per kilowatt-hour. Accordingly, even if in-house staff and the necessary consultants worked for free, the most that the CEP could save is one mil. And, since there are costs to provide the necessary functions on an in-house basis (even in-house staff is not free), any possible savings would necessarily be a fraction of one mil.

Also, the services for which the municipality would need the most outside support are the most expensive to obtain on an hourly basis. Legal services are the best example. For the Cape Light Compact, for example, legal services account for more than 25% of the total annual budget.[60] In fact, the amount that the Compact has budgeted for legal services, $230,000, is more than 1.25 times the total amount that a Northampton/Amherst/Pelham aggregation would collect with a one mil adder.[61]

[60] This is the budget for the Compact's power supply program, their CEP. As discussed elsewhere in the report, the Compact also operates energy efficiency programs. However, those programs have an entirely separate budget with their own (much higher) legal costs.

[61] *2019 Operating Budget*, Cape Light Compact, available at http://www.capelightcompact.org/wp-content/uploads/2019/05/Copy-of-V2-CY2019-Operating-Budget-Proposed.pdf

While aggregation specialty firms are able to perform all of the services for one mil per kWh, this is in part because they benefit from economies of scale that would not be realized by a single CEP performing the same functions in-house. Because CEP specialty firms serve many CEPs, they are able to spread the costs of certain tasks across multiple communities. A single CEP would have to absorb the entire cost itself.

Finally, the Massachusetts DPU has specifically pointed to CEPs' use of licensed energy brokers in finding that those CEPs have the technical expertise necessary to operate the program.[62] CEPs that do not use a licensed broker will need to find another way to demonstrate the necessary technical expertise.

While the self-performance approach is unlikely to yield significant cost savings, it may have another benefit. Shifting some functions in house would enable CEPs to hire in-house staff who might then pursue additional GHG reduction initiatives. Municipalities with in-house energy staff are better able to pursue such initiatives, and the self-performance approach might help.

However, there is another way to fund such staff. Massachusetts CEPs can charge an operational adder and use it to fund municipal staff. There is no need to take on the burden of performing the consulting/brokerage/legal functions in house in order to get funding for in-house staff.

Also, as the Cape Light Compact demonstrates, in Massachusetts the significant opportunity for municipal staffing comes from assuming responsibility for the energy efficiency programs. Nearly the entire Compact staff is funded through the efficiency program, not the power supply program.

Retail supply functions

In addition to the consulting/brokerage/legal functions, it has been suggested that Massachusetts CEPs could perform the retail supply functions. CEPs perform these functions in California, where there is no alternative because there is no competitive retail market for small customers.

The retail supply functions include:

- Meet all ISO New England requirements, including posting security deposits
- Meet all distribution company operational requirements, including completing Electronic Data Interchange testing
- Meet all DPU licensure requirements
- Forecast the CEP's hourly electric load

[62] *Town of Watertown*, D.P.U. 18-63, at 10 (March 15, 2019); *City of Worcester*, D.P.U. 19-41, at 13-14 (September 30, 2019).

- Forecast CEP's regulatory obligations, including the Renewable Portfolio Standard and the Solar Carve Out
- Forecast the costs of energy and capacity and of meeting the regulatory obligations
- Establish a price sufficient for the CEP to meet its obligations
- Purchase energy, RECs and other products needed to provide all requirements electicity service to the CEP participants
- In partnership with the Utility Distribution Company, process customer enrollments, opt ups, and opt outs
- Send monthly opt-out notices to new customers and manage replies

While it is theoretically possible that a municipality could meet these requirements and take over the retail supply functions, it seems unlikely that a municipality could realize a benefit that would justify assuming the costs and risks. The risks are quite significant. Retail suppliers that misjudge their load or cost forecasts can lose millions of dollars and even end up in bankruptcy. For example, Agera Energy, at one time one of the largest suppliers of CEPs recently filed for bankruptcy[63] after fulfilling several CEP contracts that provided great savings for customers but undermined the company's finances.

Also, it may be difficult to secure DPU approval of this approach. The DPU looks to CEPs' use of retail suppliers as evidence that the CEP has met the statutory requirement of reliability.[64] Of the well over 100 CEPs approved by the DPU, none has proposed to serve as its own retail supplier. With only a small handful of exceptions,[65] even very large and very sophisticated electricity customers in Massachusetts use retail suppliers, rather than assuming the risks of the market on their own. A CEP that proposes to self-perform the retail supply functions is likely to encounter intense regulatory scrutiny.

E. Potential green initiatives

1. Energy manager

An easy and highly-effective strategy for CEPs is to use an operational adder to fund a municipal energy manager position. As described elsewhere in this report, a dedicated municipal staff person can be a driver of green initiatives. Because operational adder revenues can only be used to cover costs associated with the program, the energy manager's job responsibilities would need to be linked to the program.

[63] *In re Agera Energy LLC*, et al., United States Bankruptcy Court, Southern District of New York, Case Nos. 19-23802 – 19-23807.

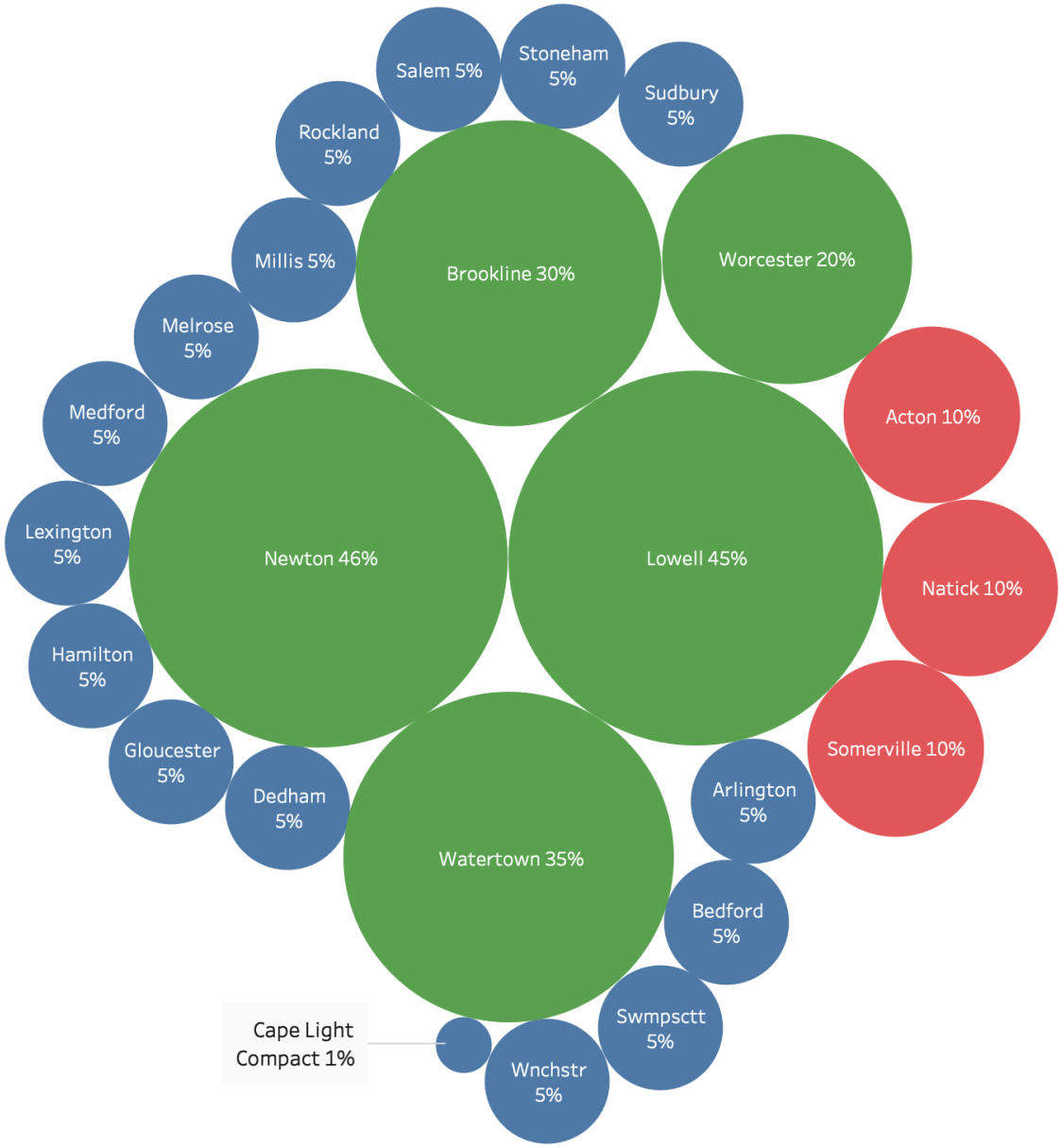
[64] *City of Worcester*, D.P.U. 19-41 at 2 (September 30, 2019).

[65] One of those exceptions, Harvard University, explains that it first assumed the retail supply functions when the retail market was in its infancy and retail suppliers were not yet offering the sophisticated pricing options that the University was looking for. Now, those pricing options are readily available from retail suppliers.

2. Annual REC purchases

The most popular strategy among green CEPs in Massachusetts is to include additional RECs in the aggregation's electricity supply, over and above the RECs required by the state's Renewable Portfolio Standard (RPS). Among current aggregations, the percentage of additional RECs ranges from 1% to 46%. The figure below shows CEPs using this strategy and their percentages of additional RECs.

Additional Percentage of Class I RECs by Massachusetts CEPs



The figure above shows the percentage of Massachusetts Class I RECs in the CEP's standard product, the product that participants receive by default. Most aggregations also offer optional products, allowing consumers to opt up to a product with 100% RECs or to opt down to a product with only the minimum percentage of RECs required by the RPS.

This strategy is quite easy to implement. Competitive retail suppliers will bid prices for additional RECs along with their bids to supply power. The key decisions for the CEP are what percentage and what types of additional RECs to select.

The cost of the additional RECs is dependent on market prices. The price of MA Class I RECs is volatile. It has ranged between $10 and $40 over the last several years. At $10 per REC, 10% additional would add 0.1¢/kWh to the CEP price for electricity, which is approximately a 1% price increase. At $40 per REC, 10% additional would add 0.4¢/kWh, a 4% price increase.

Some green advocates have discussed whether purchasing additional RECs leads to "additionality," i.e., whether it causes more green electricity to be generated than would have been generated otherwise. The REC purchasing strategy produces additionality in the same way that the Massachusetts Renewable Portfolio Standard produces additionality.[66] Neither approach produces specific, new renewable energy generators in the current year. Instead, both approaches create a market demand for RECs, which will lead to the development of new projects over time to meet that demand. Both strategies produce market-based additionality (increasing market demand) rather than direct additionality (causing a specific project to be built).

Some CEPs prefer to promote direct additionality, which leads them to consider the long-term contract approach described below.

3. Long-term contracts with renewable generators

As an alternative to annual REC purchases, CEPs can consider entering long-term contracts with renewable generators. While this has been discussed, we are not aware of any Massachusetts CEP that has implemented it.

Under this approach, the CEP would enter into a power purchase agreement (or virtual power purchase agreement as discussed below) with a renewable generator. The CEP would commit to make payments for a long term, e.g., 20 years, and in return receives the output of the project for the same period. Typically, the CEP would purchase both the energy and the RECs produced by the facility.

[66] This is a difference between Massachusetts and California. In Massachusetts, the RPS is based entirely on REC purchases. California, on the other hand, requires both REC purchases and direct contracts with renewable energy generators.

There are several issues for CEPs to consider with regard to this approach.

First, while the purpose of the initiative is to enable a new renewable energy project to obtain financing by providing a secure, long-term revenue stream to the project, it is not certain that a commitment from a CEP would be sufficient to accomplish that objective. As typically configured in Massachusetts, a CEP is just a program of a municipality; it is not an entity that can make a long-term commitment. It might be possible to overcome this obstacle by having the municipality itself back the commitment or operating the CEP through a Joint Powers Entity. This has not been tested.

Second, by entering long-term contract, the CEP is taking the risk of future energy price changes. For conventional energy purchasers, a long-term contract reduces price risk; the contract locks in prices so the purchaser does not have the risk that future prices will change. A CEP, however, is effectively an energy seller. And, the CEP's customers are not locked in; customers are free to leave at any time. As a result, by locking in a long-term supply price, the CEP takes a risk that market energy prices will drop in the future. If prices drop, the CEP will either have to sell energy at a loss or lose customers.

Third, by committing its long-term revenue stream to a single project in year one, the CEP is reducing its ability to implement other environmental initiatives during the term of that commitment. Assume, for example, that a CEP generates $500,000 per year that it can apply to green initiatives. If the CEP commits $500,000 per year to a renewable generator under a 10-year contract, the CEP would have no funds for new green initiatives during that 10-year period.

Finally, as they are configured today, CEPs in Massachusetts cannot buy power directly from a generator. Under the rules of ISO New England, the entity that runs the New England power grid, only qualified Market Participants can buy power at wholesale. The ISO's requirements are complex and very expensive to meet. Very few entities other than energy companies have undertaken to meet them.

Fortunately, there is a relatively easy way around this final challenge. Some large energy users such as MIT and the Boston Medical Center are making long term commitments to a generator using a virtual power purchase agreement.[67] Under this approach, the customer purchases the RECs and enters a contract for differences for the energy.[68]

The contract for differences works as follows: The customer commits to a price for the energy. As the power is produced, it is sold into the market. The customer pays the

[67] This project is described in a case study. *Innovation through Aggregation: A case study of partnership to purchase renewable energy*. A Better City. April 2017. https://www.abettercity.org/docs-new/Innovation_Through_Aggregation.pdf

[68] For distributed energy projects that are eligible for net metering, the virtual power purchase agreement is not necessary. The project developer can be certain of getting the net metering price for the energy.

generator the difference between the sale price and the contract price. If the sale price is below the contract price, the customer pays the generator. If the sale price is above the contract price, the generator pays the customer. Even though the customer does not take title to the energy, the contract for differences gives the generator the price certainty that can enable the project to be financed and built.[69]

4. Modular investments in new renewable generation

As an alternative to entering long-term contracts, CEPs could support new, local renewable generation using a modular investment strategy.[70] Under this approach, the CEP would collect funds through an Operational Adder, and make an upfront payment to a renewable energy project developer in return for a long-term commitment for the RECs and/or electricity generated by the project.

A key feature of this strategy is that the CEP makes a single payment up front. The CEP is not making a long-term commitment to make payments over time. The commitment to the new project is limited to the funds collected through the adder over a year or two. In other words, the commitment is limited to the funds that the CEP has, or soon will have, on hand. The CEP does not commit future revenues.

This approach limits the size of projects that can be funded in any year. However, assuming that the CEP maintains the strategy over time, the CEP would support development of multiple small projects which could sum to the size of one large project. For example, a CEP could potentially choose either:

a) a long-term contracting approach, entering a 10-year contract with one 5 MW generator; or

b) a modular approach, investing in one 0.5 MW project each year for 10 years

A significant advantage of the modular approach compared to long-term contracting is that it gives the CEP a great deal of flexibility. The CEP can adjust its level of commitment each year based on market factors, e.g., the delta between the CEP price and the Basic Service price. Also, the CEP would be able to invest in different technologies in different years, and would benefit from declines in the cost of renewable energy projects. For example, according to the National Renewable Energy Laboratory,

[69] Some communities that are interested in long-term contracting are considering a new, non-CEP approach known as Community Empowerment (www.communityempowerment.org). In this approach, which requires statutory authorization, the community enters a long-term contract, but the costs of the contract are collected through utility distribution rates rather than the supply charge. The advantage of this approach is that revenues are guaranteed because they are collected through distribution rates. It avoids the risk that a CEP would face of customers opting out and leaving the CEP without the funds to pay the renewable energy project developer.

[70] This strategy is being actively explored by one Massachusetts CEP, although it has not been implemented yet.

the cost of commercial PV systems fell 66% between 2010 and 2018.[71] If costs continue to decline, the CEP could support larger renewable energy projects in future years for the same investment. Finally, the CEP would not have the liability of a long-term financial commitment.

5. Reducing electricity use at the times of greatest environmental impact

From an environmental perspective, all kilowatt-hours are not created equal. Electricity in New England is generated by a mix of power plants that have varying environmental profiles. For example, the power plants that generate electricity by burning natural gas produce about half as much CO2 per kilowatt-hour of electricity as do power plants that burn oil.[72] The mix of power plants that are generating at any point in time determines the amount of CO2 emitted for each kilowatt-hour.

As the Department of Energy Resources explains:

> ISO New England dispatches sufficient power plants to meet demand on a lowest-cost approach using energy bids placed by power plants. When wholesale electricity prices rise, non-pipeline natural gas fuels (such as oil, LNG, and coal) become economic and are dispatched. Frequently, non-natural gas fuels (oil and coal) are at the costliest end of the dispatch order, and are also the highest emitters of greenhouse gases and other air pollutants on a ton-per-MWh basis.[73]

Because the highest emitters tend to be more expensive, they run less frequently than less expensive, cleaner generators. However, under certain conditions, the highest emitters do run, with a significant impact on GHG emissions.

An extreme example occurred during the regional cold snap from December 25, 2017 to January 8, 2018. The very cold weather lead to an increase in natural gas used for heating, which limited the availability and increased the price of natural gas for electricity generation. With natural gas at a premium, oil-fired generation became economic.[74] Oil-fired generation went from 2% of the mix on December 24 (before the cold snap) to 36% on January 6.[75] Daily CO2 emissions during the cold snap were 250,000 short tons, up from 90,000 short tons.[76]

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[71] *US Solar Photovoltaic System Benchmark: Q1 2018.* National Renewable Energy Laboratory. November 2018. At p. 27. https://www.nrel.gov/docs/fy19osti/72399.pdf

[72] NEPOOL Generation Information System, 2018 System Mix by Fuel, www.nepoolgis.com.

[73] *Massachusetts Comprehensive Energy Plan*. Massachusetts Department of Energy Resources. 2018. at 59.

[74] https://www.iso-ne.com/static-assets/documents/2018/05/2018-05-11-egoc-a2.1-iso-ne-post-winter-1718-review.pdf, slide 20.

[75] *Id* at slide 49.

[76] *Comprehenisve Energy Plan* at 59.

It would be possible for a CEP to implement an initiative that encourages participants to reduce use at times of maximum environmental impact. The initiative could use the same mechanisms as conventional demand response programs, such as appeals to customers, controllable thermostats and other devices, and energy storage.[77] However, instead of targeting the highest-cost hours, the initiative would target the highest-emissions hours.

Because of metering limitations for small customers (discussed in section 3 above), the CEP would not be able to document its participants' exact energy use reduction during high-emissions periods. However, this is much less important for a program focused on emission reduction than for a program focused on cost reduction. Exact metering is needed for CEPs to realize any cost savings from reductions during high-cost periods. However, an environmental benefit will be realized when CEP participants reduce use during high-emissions periods, whether or not they have the meter data to document that they caused the reduction.

6. Fuel switching

CEPs may wish to consider initiatives that promote fuel switching, for example from oil and natural gas heating to electric heat pumps and from conventional vehicles to electric.

In the *Massachusetts Clean Energy Plan*, the Department of Energy Resources highlighted the importance of fuel switching for reducing GHG emissions.[78] The state has achieved and will continue to achieve significant reductions in emissions from electricity generation. However, the state has done much less to reduce emissions in the thermal and transportation sectors. As a result, those sectors are responsible for an increasing percentage of emissions. The *Clean Energy Plan* shows that continuing to build renewable generation while neglecting to address thermal and transportation will not get us to our climate goals. The state needs to move customers from relatively dirty heating and transportation fuels to cleaner electricity.

The state's energy efficiency programs are beginning to support some fuel switching measures, particularly heat pumps. However, those programs are constrained by a regulatory framework that focuses on cost rather than the environment. CEPs have much more flexibility to implement initiatives that put climate first.

[77] Because the highest-emission hours are in the winter, the usefulness of solar PV will be limited. Irradiance is of course low in the winter, and snowfall can further reduce PV output, as happened in the 2017 – 2018 cold snap. ISO NE at slide 83.

[78] *Comprehenisve Energy Plan,* at xiv.

7. Price options

One important tool at CEPs' disposal is the prices that they charge to customers. As discussed above, limitations in metering prevent CEPs from charging prices that vary by time of use. However, CEPs can charge different prices to different customers. For example:

- 100% Green Products. Many CEPs currently charge higher prices to customers choosing optional 100% green products.
- Electric vehicles. CEPs could charge lower rates to customers that have electric vehicles, perhaps in conjunction with a controllable charger that would enable the CEP to shift charging times based on the environmental profile of the electric grid. Or, the CEP could perhaps provide free electricity to public electric vehicle charging stations.
- Heat pumps. CEPs could charge lower rates for customers that install electric heat pumps, perhaps coupled with an incentive for the equipment.

8. Energy efficiency programs

As discussed earlier, Massachusetts law permits CEPs to gain access to the energy efficiency charges collected through distribution rates and to operate the associated energy efficiency programs. Given the scale of the Massachusetts rate-payer funded energy efficiency programs, this gives CEPs access to very significant funding. As noted above, for an aggregation the size of Northampton, Amherst, and Pelham, MA, the energy efficiency funds would be nearly $5 million per year.

In considering whether to take advantage of these funds, CEPs should consider several factors. First, because the programs are funded through distribution rates, the DPU regulates them very closely. And, the DPU applies the same rules to CEP-administered programs as to utility-administered programs. As a result, any CEP choosing to administer the programs will need to take on a significant regulatory compliance burden.

Second, the CEP should keep in mind that efficiency programs will be available to customers whether or not the CEP takes over the programs. The issue is not whether there are programs for customers. The issue is who administers the programs, and how the CEP might do so differently than the utilities.

The greatest value that the CEP would add from administering the programs would come from offering something different from what the utilities offer, for example, programs that better fit the specific needs of the CEP's customers, or programs that are optimized for GHG reduction rather than cost reduction. However, a CEP's ability to offer something different is limited. Massachusetts has placed a high premium on

program consistency across all program administrators. As a result, the DPU has taken a dim view of unique offerings.

The recent experience of the Cape Light Compact is instructive. In its most recent three-year plan, the Compact proposed two new "enhancements" to the statewide plan. (Enhancements are unique offerings that are materially different from what all program administrators are offering.) One of the Compact's enhancements focused on energy storage and the other on strategic electrification -- a package of heat pumps, solar PV, and energy storage. The DPU rejected both enhancements.[79]

The DPU did invite the Compact to modify and resubmit its strategic electrification enhancement. The DPU's ruling on the revised enhancement should provide some guidance on whether a CEP that takes over the programs will be able to offer something unique or may simply end up end up running the same programs that had been run by the utility that the CEP replaced.

F. Multi-community consortiums

This section discusses issues related to multi-community consortiums for CEP in Massachusetts. It addresses issues including size, geography, and culture. It also discusses flexible approaches to expand or shrink a consortium for specific initiatives.

1. Size

The size of the CEP is the first issue to consider. Is there a maximum size? What is the minimum size for the CEP to be effective? How might the size of potential joint CEPs in Massachusetts compare to the size of joint CEPs in other states?

Size relative to CEPs in California

The consideration of joint CEPs often begins with a look at California. There, the CEP market has developed around joint CEPs, unlike Massachusetts where individual-community CEPs dominate. And, of course, California is much larger, with a population of 40 million, as opposed to 7 million in Massachusetts. In California, 19 CEPs serve over 10 million customers.[80] In Massachusetts, there are over 125 CEPs that together serve fewer than 1.5 million customers.

[79] *Three-Year Energy Efficiency Plans for 2019 – 2021*, D.P.U. 18-110 through 18-119 at 113 -133 (2019).

[80] CALCCA, www.cal-cca.org. accessed October 31, 2019.

The tables below show the number of customers served by selected CEPs in California and Massachusetts.

California

CEP	Customer accounts
Clean Power Alliance of So. California	1,000,000
East Bay Community Energy	540,500
MCE (Marin and Napa Counties)	475,000
Peninsula Clean Energy	300,000
Monterey Bay Community Power	235,000
Sonoma Clean Power	224,000
Pioneer Community Energy	85,000
Valley Clean Energy	65,000
Redwood Coast Energy Authority	63,000
Pico Rivera Innovative Municipal Energy (est.)	30,000
San Jancito Power	16,000
Rancho Mirage Energy Authority	15,000
Solana Energy Alliance	7,000

Massachusetts

CEP	Customer accounts
Boston[81]	175,000
Cape Light Compact	140,000
Worcester[82]	48,000
Cambridge	39,000
Somerville	34,000
Newton	27,000
New Bedford	26,000
Lowell	23,000
Brookline	20,000
Northampton, Amherst & Pelham[83]	17,000
Pittsfield	15,000
Lexington	10,000
Most others	< 10,000

Maximum size

One question that has been asked is whether there is a maximum size for a joint CEP. There is no practical maximum, at least for a state the size of Massachusetts. California has one CEP with 1 million customers. It is difficult to even imagine a CEP in Massachusetts ever approaching that size.

Minimum size

Another question is whether there is a minimum size for a joint CEP. Here, the answer likely depends on what the CEP intends to do.

Providing power supply

For the core CEP function of providing power supply, a few thousand customers is

[81] The Boston CEP is under development and has not launched. This is an estimate of the number of customers that it will serve when it launches.

[82] The Worcester CEP is in the process of launching. This is an estimate of the number of customers that it will serve.

[83] This is an estimate of the number of customers that would be served by a joint aggregation made up of Northampton, Amherst, and Pelham.

likely sufficient. There are many individual community CEPs in Massachusetts that are smaller than that.

Also, while there is a common impression that the larger the CEP the better the price it gets for electricity, that is not true in practice. As long as a CEP is of a minimum size, the price is determined by the nature of the CEP's electric load and not by the size of that load.

Providing a greener power supply

For providing a power supply that includes additional Renewable Energy Certificates, the most popular green CEP strategy in Massachusetts, a few thousand customers is also likely sufficient. This is something that even small, individual-community CEPs are doing in Massachusetts now.

Administering the energy efficiency programs funded through the system benefit charge

As discussed above, Massachusetts CEPs can apply for authorization to take over the administration of the system-benefit-charge-funded energy efficiency programs for customers in their geographic footprint.[84] When this is allowed, the CEP replaces the utility as the administrator of those funds. Only one Massachusetts CEP has been approved to administer the energy efficiency funds: the Cape Light Compact, the largest existing CEP.

To estimate a minimum size to administer the energy efficiency programs, we looked at the size of the existing program administrators, using as "size" their electricity efficiency program budgets. We also estimated the likely size of the budge for a joint aggregation the size of Northampton, Amherst, and Pelham.

Annual budgets – Electricity Efficiency Programs

Program Administrator	Annual Budget ($ million)
Eversource	306
National Grid	291
Cape Light Compact	54
Unitil	6
Northampton-Amherst-Pelham (est.)	5

As the table shows, the potential Northampton-Amherst-Pelham joint CEP would be the smallest of the program administrators, just 10% of the size of the Cape Light Compact

[84] The CEP assumes the administration of the programs for all customers within the CEP's boundaries, including customers that are not receiving power supply through the CEP.

and less than 2% of the size of Eversource and National Grid. However, the joint CEP would be roughly the same size as the smallest program administrator, Unitil. At this size, Unitil is able to provide effective programs for its customers, and it is reasonable to assume that a joint CEP of like size would be able to do the same.

Importantly, a new program administrator would not have to perform all of the program functions in-house. All of the program administrators, including the largest, outsource program delivery to outside vendors. Also, the program administrators jointly procure many services, including evaluation and certain program management tasks. Moreover, a new program administrator would not have to build all of the required program administration infrastructure. For example, to meet Department of Public Utilities reporting requirements, program administrators must maintain a complex database. However, rather than building its own, a new administrator could possibly contract with the Cape Light Compact to use the Compact's database. There would of course be a cost associated with this, but it could be significantly less expense to pay to use an existing database than to building a new one.

2. Geography

Another question about joint CEPs is whether they need to share a common geographic identity.

It is certainly true that the existing joint CEPs tend to share a geographic identity. For example,

- Cape Light Compact (Cape Cod)
- Clean Power Alliance of Southern California
- East Bay Community Energy
- Silicon Valley Clean Energy
- Sonoma Clean Power
- Westchester Power

This geographic identity is useful for marketing purposes. It associates the CEP with something familiar to customers and gives them sense that the organization is local, even if it is not limited to just their municipality.

Whether there are other advantages depends on the particular CEP function. For power supply, at least in the Massachusetts electric market, geographic proximity is not required. The participating communities do not need to be adjacent, or even near to each other. The CEP's electricity supplier buys power in the New England power market; municipal boundaries are irrelevant. The only geographic requirement is that the communities be in the same state; this is because CEPs and retail electricity suppliers are regulated at the state level.

It is true that if the communities are scattered, they are more likely to be served by different distribution utilities. However, this is not an impediment. In Massachusetts, some individual towns with CEPs are served by two utilities. For example, the Town of Bellingham is served in part by Eversource and in part by National Grid. Also, Westchester Power in New York is a multi-community CEP that includes communities in two different utility service territories, Consolidated Edison and NYSEG. The need to deal with two utilities creates some additional administrative challenges, but the challenges are not insurmountable.

For programs that involve work at customer locations, e.g., energy efficiency or installation of on-site solar, geographic proximity can be an advantage, reducing travel time between jobs and potentially the number of crews required. However, this challenge can be overcome. CEPs typically use third-party vendors for on-site work, rather than performing this work with staff. To serve a wide footprint, a CEP can contract with vendors in multiple locations or vendors that serve all of the CEP's communities.

One factor that is likely related to geography is whether the communities have a history of working together. The communities on Cape Cod have a long history of joint action. Indeed, the Cape Light Compact came out of their county government. Many of the Massachusetts communities that have run joint energy programs, such as Solarize (a PV program) and HeatSmart (a residential heat pump program) have a history of working together on economic development and other issues. Communities can of course always make new partnerships. But, it can be easier to have success with partners you know and have worked with in the past.

3. Goals

Perhaps more important than whether the communities share borders is whether they share goals. Joint CEPs are more likely to be successful if the communities want to use CEP to advance the same purpose, reducing greenhouse gas impacts, for example. A joint CEP may be less successful if some communities prioritize reducing emissions and others prioritize customers' bills.

Even this challenge may not be insurmountable. It is possible for a CEP to offer different default electricity products for different participating communities. With Westchester Power, for example, residents in some communities receive a green product by default, but can choose a lower cost, "basic" product, while residents in other communities receive a basic product by default, but can choose a green product.[85] Also, it would

[85] https://westchesterpower.org/basic-or-green-supply/

seem possible for a CEP to offer 3.0 programs that some communities participate in and others do not.

However, if the members of the joint CEP don't share the same goals, it would be fair to ask whether there is a reason to have a joint CEP. A joint CEP can accommodate members with divergent goals, but it might not create much value beyond what the members could create through individual CEPs.

4. Culture

As important as whether municipalities share goals, is whether they share a culture. For this purpose, we are using culture to mean the roles that the municipality is willing to play and the actions that it wishes to encourage its residents to undertake. For example:

- **Municipal finance of residents' purchases:** Some municipalities may be willing to use municipal funds to finance residents' purchases of distributed generation for their homes or businesses. Others may not want to use municipal funds for this purpose.

- **Consumer debt:** Some communities may be willing to sponsor initiatives that encourage residents (including low-income residents) to borrow money to finance the installation of distributed generation. Other municipalities may not want to encourage citizens to assume additional debt.

- **Electricity price risk:** Some communities may want to sponsor initiatives that expose residents to energy price risk. Others may prefer protecting residents from those risks.

5. Flexibility

Choosing the right set of communities for a joint CEP can seem to be a daunting task. Are we big enough? Close enough? Similar enough in our goals?

However, the model is quite flexible. Communities can partner on CEP initiatives whether or not they are part of the same legal joint entity. In Massachusetts, communities and other entities regularly conduct joint procurements for power supply and other energy services. Because they are not part of the same legal entity, each community signs its own contract with the supplier. However, much of the upfront work is done together: the program is designed together, the procurement conducted and the supplier chosen together, and the contract negotiated together. Examples of this joint activity include:

- A joint procurement for a CEP power supplier by communities in southeastern Massachusetts

- Joint procurements for electricity and natural gas by members (municipalities and nonprofits) of PowerOptions, a buying consortium

- Joint procurement for energy efficiency services by communities in metro Boston and in the Merrimac Valley

These examples are not offered as reasons not to form a true joint CEP. Rather, they are offered to encourage communities considering forming such a CEP to move ahead, and not to wait to get the perfect initial group. The joint CEP can always be expanded, either by adding full members or simply by partnering with other communities on an initiative-by-initiative basis.

Also, as noted above, if, after a joint CEP is formed, it turns out that some communities want a different approach, the CEP can tailor its offerings for different member communities.

G. Regulatory transition plan

This section discusses a regulatory transition plan for a Massachusetts CEP[86] that wants to implement advanced GHG reduction initiatives. The discussion is focused on regulatory transition plans – how and when the aggregation plans that must be approved by the state should be drafted, and potentially amended, to authorize various green initiatives. It does not address the business transition plans that would be needed to implement the initiatives.

1. Regulatory background

To operate a CEP, a municipality must develop an aggregation plan and have the plan approved by the DPU. In order to be approved, the aggregation plan must satisfy both procedural and substantive requirements.

To satisfy the procedural requirements, the municipality must demonstrate that it has 1) obtained local approval before initiating a process to develop an aggregation plan; 2) consulted with the Department of Energy Resources (DOER) in the development of the plan; and 3) allowed for citizen review of the plan.[87] In addition, the CEP plan must contain five statutorily specified plan elements: 1) the organizational structure of the program, its operations, and funding; 2) details on rate setting and other costs to participants; 3) the method of entering and terminating agreements with other entities;

[86] The discussion is focused on Massachusetts CEPs; the rules and transition strategies will be different in other states.

[87] M.G.L. c. 164, § 134(a).

4) the rights and responsibilities of program participants; and 5) the procedure for terminating the program.[88]

To satisfy the substantive requirements, the plan must provide for universal access, reliability, and equitable treatment of all classes of customers.[89] As part of the reliability analysis, the DPU examines the municipality's capability to implement the initiatives listed in the plan. In addition, the plan must satisfy all other requirements for aggregated service.

For CEPs that want to assume administration of the energy efficiency programs that are funded through utility rates, there is a second regulatory hurdle. After obtaining approval for the aggregation plan, the municipality must adopt and obtain DPU approval of an "energy plan" that describes the energy efficiency programs the municipality intends to implement and shows that those programs are consistent with the state energy conservation goals.[90]

2. What's in the CEP plan?

Many municipalities are implementing a host of GHG reduction initiatives. While some of these initiatives are necessarily part of a CEP, many others could be implemented in parallel with a CEP but as distinct initiatives.

Initiatives need to be included in the CEP plan if they are directly tied to their CEP. For example, initiatives must be included if they use the CEP's opt-out enrollment mechanism or are funded through the CEP's rates. However, the initiatives do not need to be included in the plan if they are opt-in and are funded in other ways, for example through separate bills.

Communities should consider whether it is beneficial to make these optional initiatives part of CEP. It can be argued that bringing the initiatives under the CEP umbrella would increase their impact. On the other hand, making the initiatives part of a CEP will subject the initiatives to rigorous state scrutiny. Initiatives that are part of a CEP plan are reviewed carefully by state regulators, who examine both the municipality's expertise to implement the initiative and the benefits and costs for customers. In addition, including any previously-untried initiative in a CEP plan would likely delay approval of the CEP plan as state regulators examine the new initiative.

[88] Id.

[89] Id.

[90] M.G.L. c. 164, § 134(b).

3. Summary of approach

For communities considering launching a CEP, and considering implementing advanced green initiatives, we recommend the regulatory approach described below. The approach is designed to get a CEP up and going quickly in order to enable the municipality to gain experience and to begin delivering benefits for customers. Then, additional initiatives can be added over time. The key elements of the approach are as follows:

Initial CEP Plan followed by an Amended CEP Plan as needed
The initial CEP plan should include as many of the green elements as possible without jeopardizing or significantly delaying plan approval. As discussed below, the green CEP plans that the DPU has approved include several green initiatives.

If the community determines that it wishes to implement additional green initiatives, and wishes to do so as part of the CEP rather than as independent initiatives, the community can file an amended CEP plan to request authorization for the new initiatives. The amended plan would go through the same approval process as the initial plan.

An advantage of addressing these newer CEP elements as part of an amended plan is that the likely regulatory scrutiny of the new initiatives would not delay approval of the core plan; the core plan would be up and going while the new initiatives are being reviewed. Also, with this approach, the CEP will have time to fully plan the new initiatives, increasing the likelihood that the CEP will be able to satisfy state regulators' detailed questions about how the initiative will work and how customers will be affected.

Energy Plan for administration of the energy efficiency and renewable energy funds
Under Massachusetts law, CEPs wishing to administer the energy efficiency and/or renewable energy funds must submit for approval an energy plan detailing how they will use those funds. This is separate from the CEP plan and must be submitted after the CEP plan is approved.

4. Initial CEP plan followed by Amended Plan as needed

The aggregation plans filed by many green CEPs in Massachusetts, and approved by the DPU, provide templates for initial plans for communities that wish to evolve toward more advanced green initiatives. These plans cover the core elements of CEPs as well as green CEP elements such as providing additional[91] Renewable Energy Certificates in the aggregation's standard product and even more RECs in an optional product.

[91] "Additional" meaning in addition to the RECs required by the state Renewable Portfolio Standard.

If the municipality wishes to charge an operational adder to fund green initiatives, the amount and uses of the adder must be specified in the plan.

Once an approved CEP plan is in place, a municipality can seek approval to amend the plan if needed to add additional green initiatives.

The regulatory process for a plan amendment is the same as for the initial plan approval. The DPU will review the entire new plan, not just the amendment.

However, since the original plan had been previously reviewed, the degree of regulatory scrutiny of the original plan elements is reduced. The review of the amended plan can be focused on the new initiatives.

5. CEP administration of ratepayer-funded energy efficiency programs

There is a separate, additional regulatory process for municipalities wishing to administer the state energy efficiency programs. The aggregation statute provides that a municipality seeking to administer those programs must:

> adopt an energy plan which shall define the manner in which the municipality or municipalities may implement demand side management programs and renewable energy programs that are consistent with any state energy conservation goals developed pursuant to chapter 25A or chapter 164.[92]

Then, the plan must be submitted to the DPU for certification that it is in fact consistent with state energy conservation goals.

The regulatory process from that point is uncertain. Much has changed since the aggregation statute was adopted in in 1997 and since the first (and to date only) municipal aggregator was approved as an energy efficiency program administrator nearly 20 years ago. At that time, the efficiency programs were utility-specific and operated under annual plans. However, the 2008 Massachusetts Green Communities Act[93] changed that system to one of statewide programs operated under three-year plans. No aggregator has become a program administrator since this new regime took effect.

It appears from correspondence between the DPU and the City of Lowell that a CEP can only implement programs that have been approved as part of the statewide three-

[92] M.G.L. c. 164, § 134(a).

[93] Chapter 169 of the Acts of 2008.

year plans, and that a CEP cannot participate in the three-year planning process until after its energy plan has been certified.[94]

Since that statewide planning process takes place only once every three years, a CEP could have a very long wait before being able to implement programs. It would likely take a year or more to develop an energy plan and get it certified by the DPU. Then, depending on where we are in the statewide cycle, there could be an additional one to three years before the CEP's programs would be approved as part of the statewide three-year plans and could be implemented.

There is another factor that adds uncertainty to the process. The programs have become much larger since the Cape Light Compact first became a program administrator. In 2001, when the Compact first received approval to administer the energy efficiency programs, the total efficiency budget for the Compact territory was under $5 million per year.[95] Currently, that budget is over $50 million per year.[96] The size of the budget does not preclude new CEPs from becoming program administrators. However, it will affect the level of scrutiny the DPU applies to any proposal and the degree of detail that a CEP will be required to include in an energy plan.

H. Conclusion

CEP is a tool that Massachusetts communities can use to reduce GHG emissions. It is a flexible tool; many different GHG reductions initiatives can be implemented within the CEP framework. Municipalities should choose the set of initiatives that fits best with their own goals and strategies.

[94] Letter dated October 25, 2018 from Shane Early, General Counsel, Massachusetts Department of Public Utilities, to James Avery, regarding City of Lowell Petition to Amend Municipal Aggregation Plan.

[95] *Cape Light Compact*, D.T.E. 00-47-C (2001) p. 5.

[96] *2019-2021 Energy Efficiency Plan Term Sheet* (October 19, 2018), Attachment A, CLC.